

# MOTOR AGE

FOR AUTOMOTIVE SERVICEMEN



A CHILTON PUBLICATION

JANUARY 1942

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Fred Sloane

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Mechanic Training

• In the Headlights

• And Hundreds of Other  
Useful and Profitable  
Ideas



NEW YEAR GREETINGS

# TOUGH

# *But oh so Gentle*

TOUGH ON OIL-PUMPING • GENTLE ON CYLINDER WALLS



- By the time new rings are needed, cylinders are usually worn and tapered, and oil-pumping and blow-by are tough problems. Just any ring won't do—it takes a ring engineered for *replacement* service.

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Hastings Mfg. of Canada, Ltd., Toronto

*Piston Rings • Piston Expanders • Valv-Rings*

# HASTINGS

STEEL-VENT PISTON RINGS

U. S. Patent Nos. 2,148,997, 2,175,409

*Stop Oil-Pumping • Check Cylinder Wear*

Save  
ALUMINUM  
by

KOETHERIZING  
every  
Pulled Piston!

## FACTS ABOUT KOETHERIZING

*There is only one genuine Koetherizing! It is a patented process. There is no such thing as a "just the same" . . . no such thing as a "just as good."*

### WHAT KOETHERIZING DOES:

Koetherizing expands pistons accurately to within .001 of an inch.

Koetherizing resizes the piston permanently. Koetherized pistons will not collapse again.

Koetherizing makes all aluminum pistons "cam ground pistons."

Koetherizing is equally effective on either cast iron or aluminum pistons.

### WHAT KOETHERIZING DOES NOT DO:

Koetherizing does not result in brittleness, or weaken the piston in any way.

Koetherizing does not create piston-boss distortion.

Koetherizing does not disturb piston-pin fit.

Koetherizing does not add weight to the piston.

Koetherizing does not "fall down" under engine heat.

KOPPERS COMPANY  
AMERICAN HAMMERED PISTON RING DIV. • BALTIMORE, MD.



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# MOTOR AGE

With Which is Combined AUTOMOBILE TRADE JOURNAL.

## FOR AUTOMOTIVE SERVICEMEN

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# SHOP TALK

By

*Bill Toboldt*

## Parts Making

Factories are still turning out replacement parts in quantity, though in some cases, a real or apparent shortage has caused delays, and the inexperience of government officials with the gigantic job they have undertaken has led to confusion. Now that we are at war, everyone hopes that a good deal of the lost motion can be eliminated.

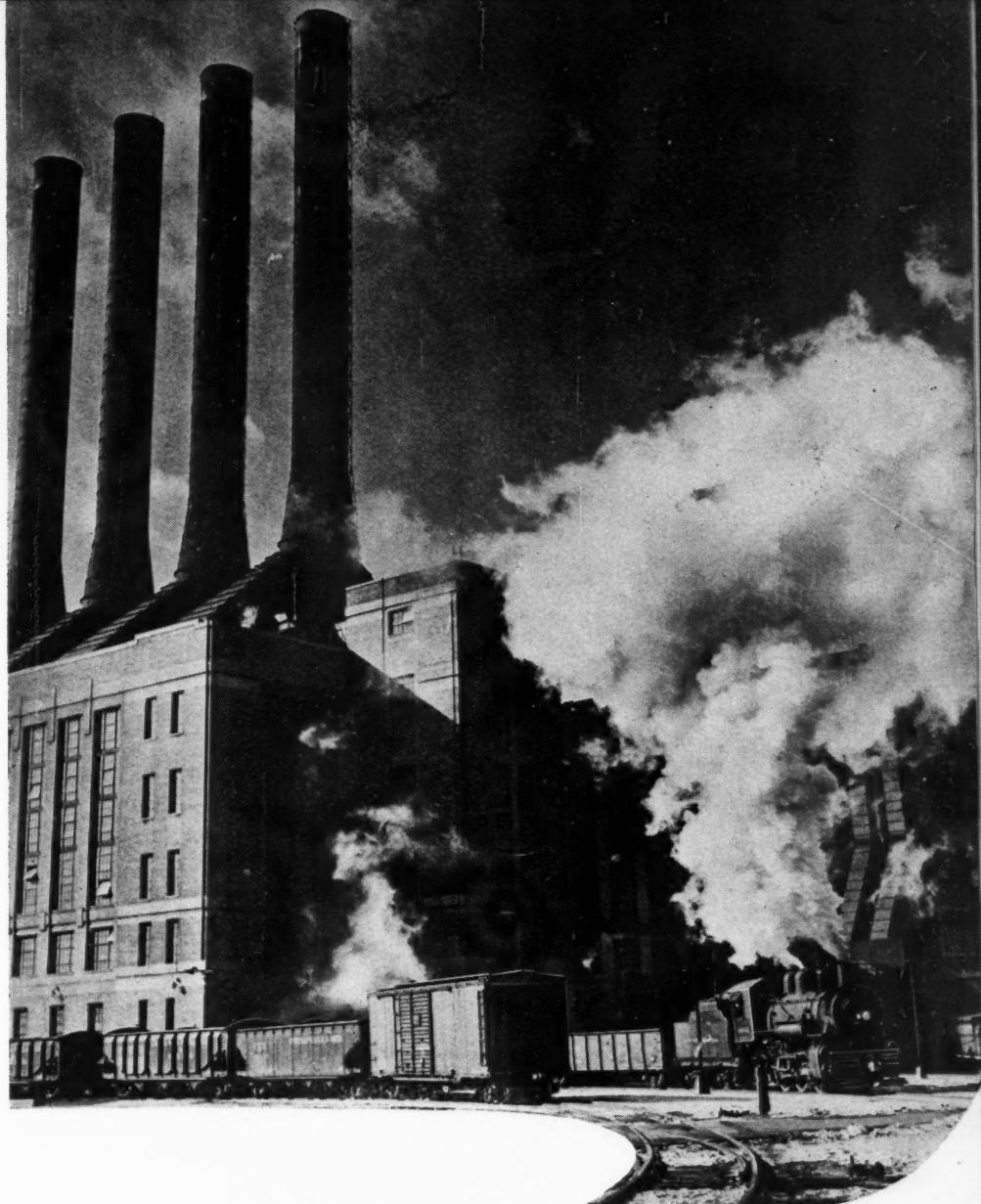
The big point, though, is that replacement parts are still being made and indications are that production will continue. That's something for which the serviceman can be grateful.

## Drainings as Fuel

Last month in Readers' Clearing House, I asked for help on behalf of Arthur Hill, who wanted to know how to build a stove that would burn oil drained from automobile crankcases. It was a question I had often heard discussed but never heard answered definitely.

Now two readers assure me that burning used crankcase oil is entirely feasible. And they back up their assertions with descriptions of stoves in which it can be burned. One even goes to the trouble of drawing a diagram of his stove.

The readers are Charles Baratta, of Hawthorne, N. J., and L. V. Webster, of Moline, Ill. You'll find their stoves



# MOTOR AGE

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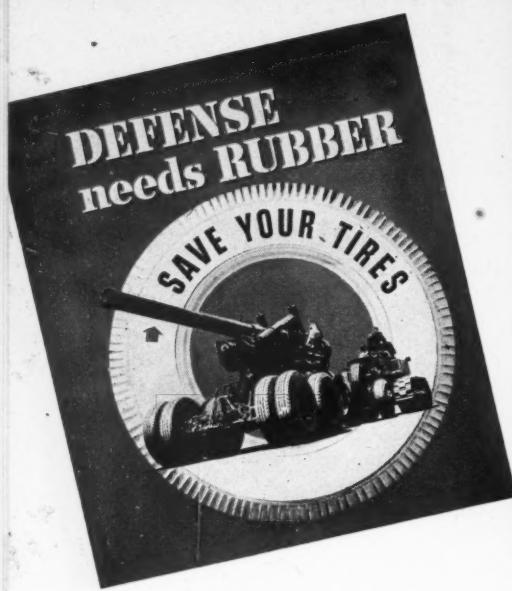
described and one of them illustrated in the Readers' Clearing House. Many thanks.

## Season's Greetings

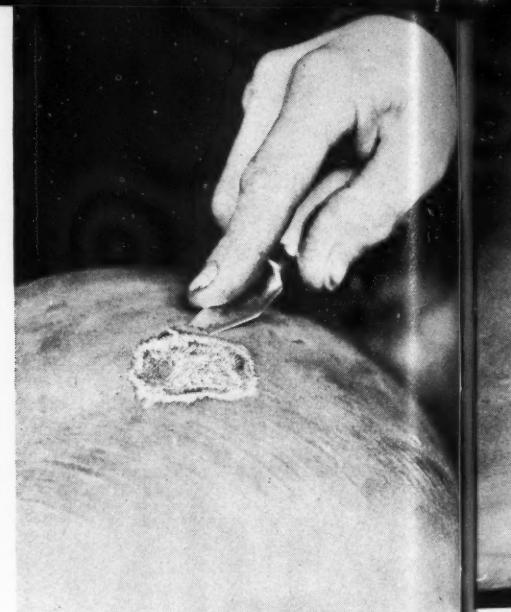
Cliff Oppel, loyal MOTOR AGE reader of Duluth, Minn., is one of scores who wrote us wishes for a merry Christmas and happy New Year. We take this opportunity of thanking every

one of them for these expressions of good will. They are particularly appreciated at this time, when such human qualities are held in low repute over so much of the world.

It is with genuine sincerity that we wish MOTOR AGE readers a happy New Year. If a more interesting and useful magazine can help make the New Year happier, they can count on that, too.



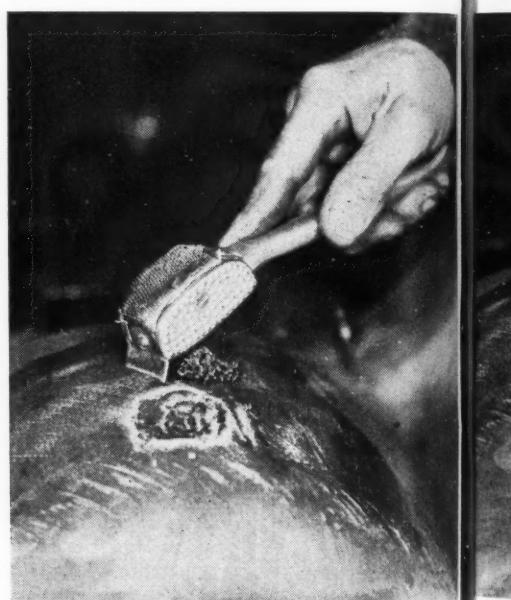
1. Turning the tire inside out for inspection reveals a cut through the center of the tread extending through the inner ply.



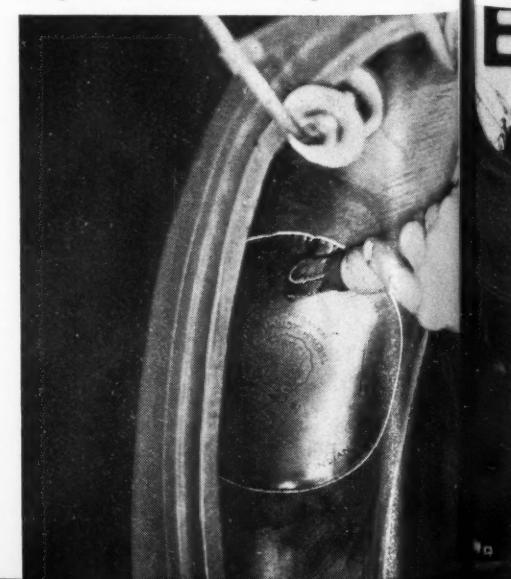
2. Trimming the fabric away from the edges of the cut to expose the plies. This insures penetration of the live rubber repair.

# HOW TO REPAIR DAMAGED TIRES

**Beat the rubber shortage  
and bring new business to  
your shop by learning how  
to repair casing breaks**



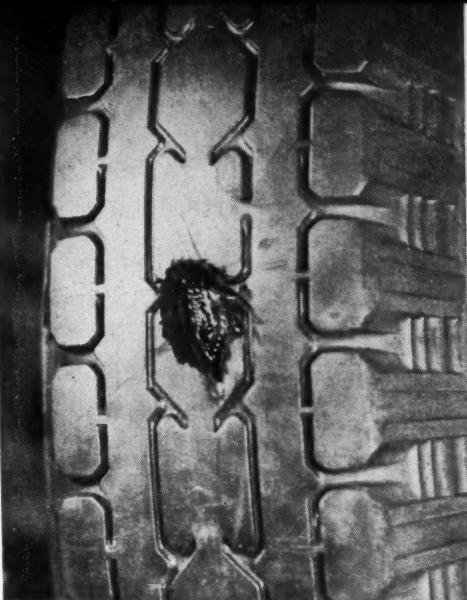
6. Scraping the cleaner off removes all foreign matter, leaving a clean surface for better adhesion of the patch.



10. Cementing a rubber and fabric patch to the inside of the tire provides added strength to the area surrounding the break.



3. Roughing the area surrounding the break with a stiff wire brush produces a surface to which the patch will vulcanize.



4. Trim the tread rubber away from the cut on the outside so the repair will penetrate the thickness of the tread and plies.



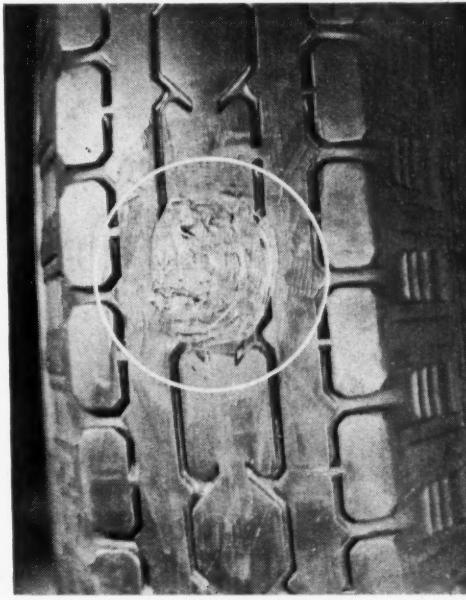
5. Cleaning the area surrounding the break with chemical cleaner to remove all dirt, soapstone, and other foreign substances.



7. Building up the area with live rubber, working from the outer edge toward the center, each strip overlapping the other.



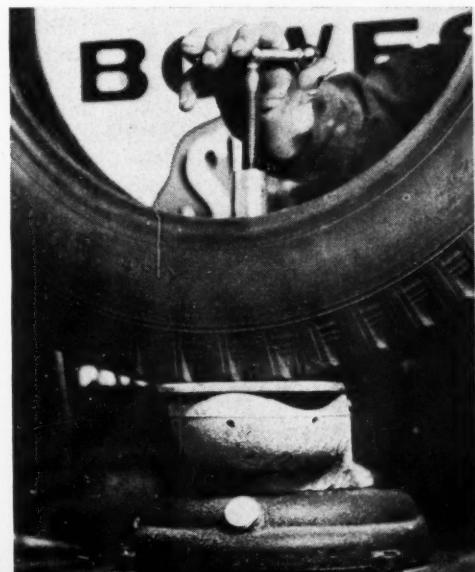
8. Stitching the new rubber with a notched roller levels out the repair and forces each strip firmly against the other.



9. Building up the break on the outside in the same manner restores the tread rubber and bonds it to the fabric.



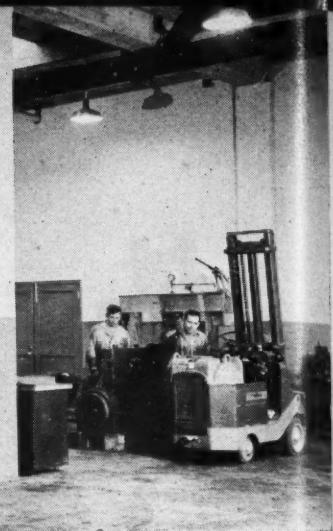
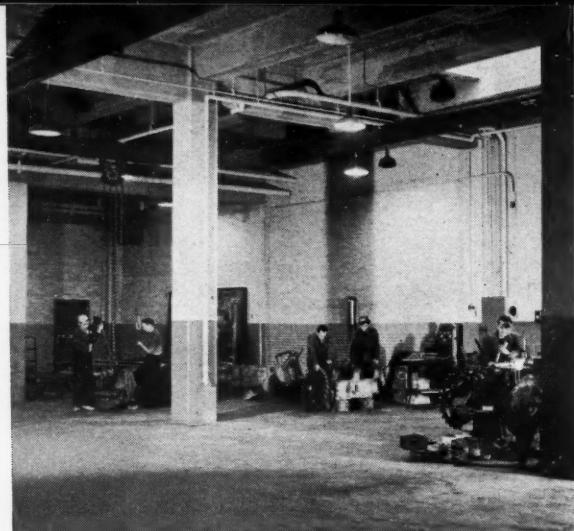
11. Placing the tire on the vulcanizer. A sand bag, block of hard rubber and a wooden block are placed over the area.



12. Clamping the tire in position on the electric vulcanizer. Thermostat control provides correct heat for curing the repair.



13. After curing for from  $1/2$  hour to  $1\frac{1}{2}$  hours, the job is ready for service. Regrooving tool cuts tread pattern in repaired spot.



Corner of the general repair shop, showing some of the equipment and the various types of work handled.

# SERVICE IN A MODEL ARMY SHOP

**Fine equipment, housed in a spacious new building, helps a Quartermaster depot keep a busy fleet in the pink**

HAVE you ever tried to imagine the kind of repair shop you'd build and equip for yourself if you could do exactly as you pleased? Probably you would have all the floor space you could possibly use. You would put in high, wide windows to let you work in daylight as much as possible, and you would install the latest and finest test and repair equipment on the market. Because it would be a dream shop, you wouldn't really expect to build one or even meet one, at least not until you saw the recently completed Motor Transport Building at the Philadelphia Quartermaster Depot.

The depot is one of the busiest of the Army's many supply bases. Within the extensive reservation are made or handled all the clothing, blankets, tents, and numerous

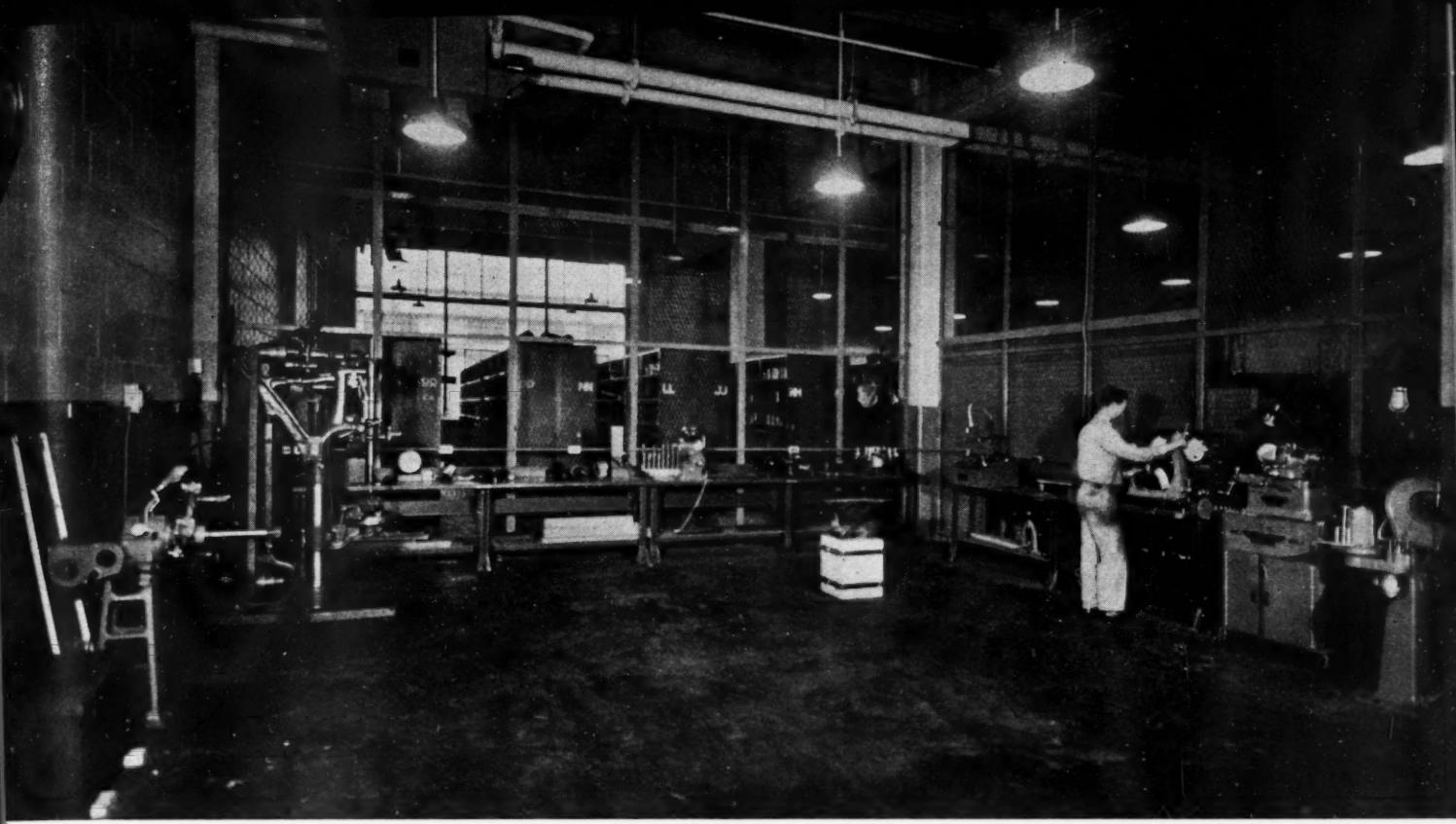
other essential articles of equipment for the entire Army. Transportation within the reservation and among the various Army establishments in the district at present requires 96 gasoline propelled vehicles, ranging in size and type from the three-wheeled warehouse tractors through officers' official cars, 1½, 2 and 2½-ton trucks, 3-ton to 6-ton semi-trailers, and tractor bulldozers to three gasoline switching locomotives. The Motor Transport Building, designed, equipped and superintended by Capt. Walter V. Giles, was erected to service a fleet that is expected ultimately to number 400 vehicles.

Modern in every detail, the one-story steel-and-concrete building has 70,000 sq. ft. of floor space, or more than an acre and a half.

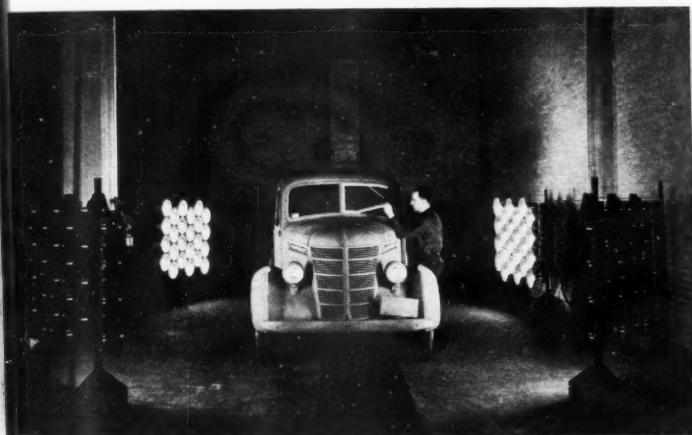
It is flooded with natural light in daytime and with abundant artificial light at night. Its circulating ventilation system keeps the interior comfortable and free of fumes in winter as well as summer. The repair shops have every convenience and every device needed for complete automotive service.

The storage garage, which occupies most of the building, is superior to others of its type chiefly in lighting and ventilation, although the wash room, locker room, and showers for the truck drivers are models of comfort and convenience.

Entering the shop the way every Quartermaster vehicle enters it for preventive maintenance inspection and service once a month, you come first to the wash racks.



The machine shop with its imposing array of repair equipment. The lathe is not shown. The parts room is in the background.



Drying a car under infra-red lamps in the paint shop. Time required is six minutes. The paint is exhausted through grille in the floor.



Washing and wiping cars in the wash rack. Cars are first cleaned with grease solvent, then washed down with hot water under pressure.

Vehicles are first cleaned with a preparation containing a grease solvent and then washed down with hot water under 300 pounds pressure. The water is supplied by the central plant on the reservation.

Passing through electrically operated overhead doors, you come to the lifts. There are two of them, and each is 26 feet long and has a lifting capacity of 13 tons, or enough for the heaviest of Army trucks. Two lights, with lenses placed flush with the floor, supply abundant light for the lubrication men and the mechanics who check the brakes and the mechanical condition of the vehicles. From

the lifts, the car or truck is routed to the department whose services are indicated.

One of the most interesting of these departments is the paint shop. This is housed in a separate room but one end is open to the rest of the shop, for lacquer fumes are no problem. They are exhausted, not through the roof or a window, but through a grating in the floor. The exhaust system has a capacity of 900 cubic feet a minute. It does its job so well that you can walk to within ten feet of a spray gun in operation without smelling lacquer. Four banks of infra-red lamps permit drying of a repainted vehicle in six minutes.

The shop is big enough to take two of the biggest six-wheel trucks.

In another room, you come to the tire and battery department. A hand-operated machine slips passenger-car tires off rims in a twinkling. The battery room has a charging line and battery tester.

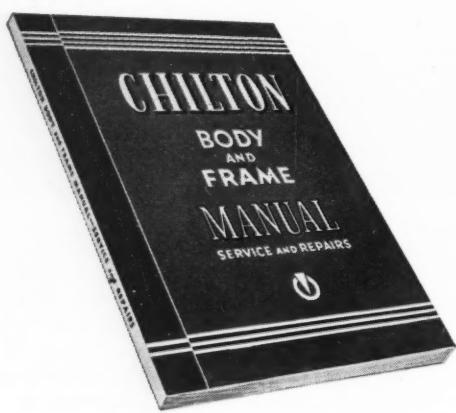
One corner of the main repair floor is devoted to the front-end machine and frame straightening. The latter can handle the passenger cars on the reservation and the lighter trucks. Near-by is a wheel balancer and the portable oxy-acetylene welding outfit. Along one wall are the motor analyzers

(Continued on page 62)



## REMOVING FRONT DOOR LOCK

**These simple directions will help  
you do a speedier job on the 1941  
Plymouth lock and control assembly**



**This article, and others in Motor Age,  
supplements the service information in  
corporated in the Chilton Body and  
Frame Manual.**

**T**HE first step in removing the front door lock and remote control assembly is to remove the door lock. Remove the cover over the set screw (1 in Fig. 1) located in the edge of the door frame, and remove the set screw. Then the lock can be pulled out of the door panel.

(When reinstalling the lock

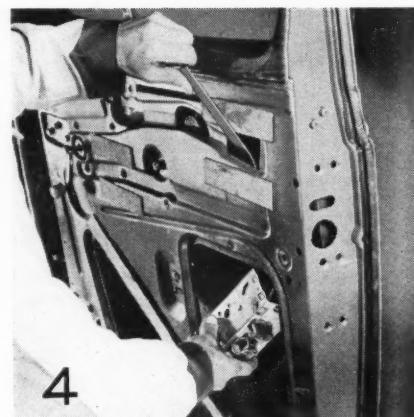
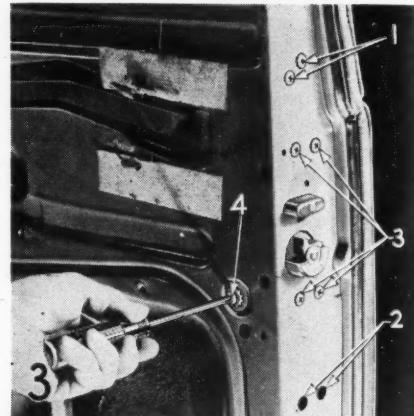
cylinder, turn the lock to the unlocked position with the key. Then turn the bearing for the lock cylinder shaft—washer with square hole—to the right as far as it will go. This may be done with a screw driver inserted through the door from the outside. Then push a long needle through the trim panel and through the lock cylinder hole in the door. Press the end of the lock shaft against the needle point and allow the needle to go back through the door. The needle serves as a guide for easily leading the lock shaft into the proper hole in the locking mechanism.)

Remove the inside door handles, garnish molding and trim panel.

Remove the three screws which hold the remote control base to the inside panel of the door, and unhook the base from the remote control bar as shown in Fig. 2.

Remove the outside door handle screws (4 in Fig. 3 and two screws on the outside of the door in the handle ferrule not shown) and pull out the handle and shaft assembly.

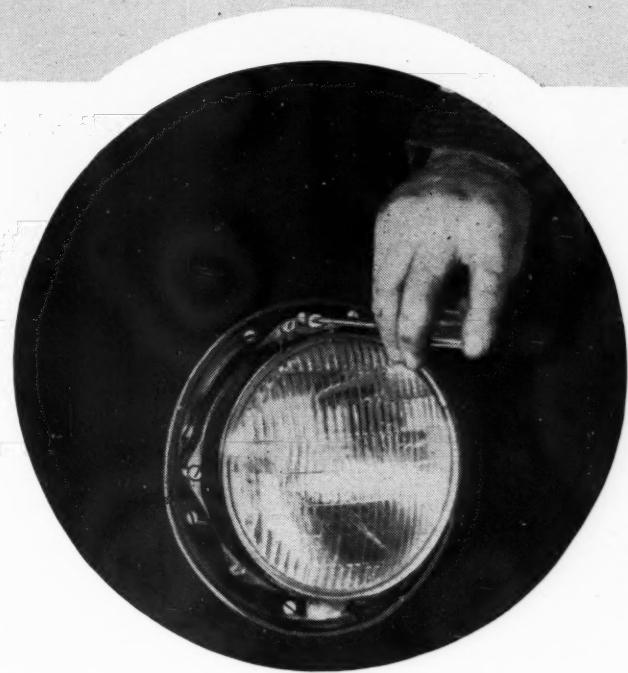
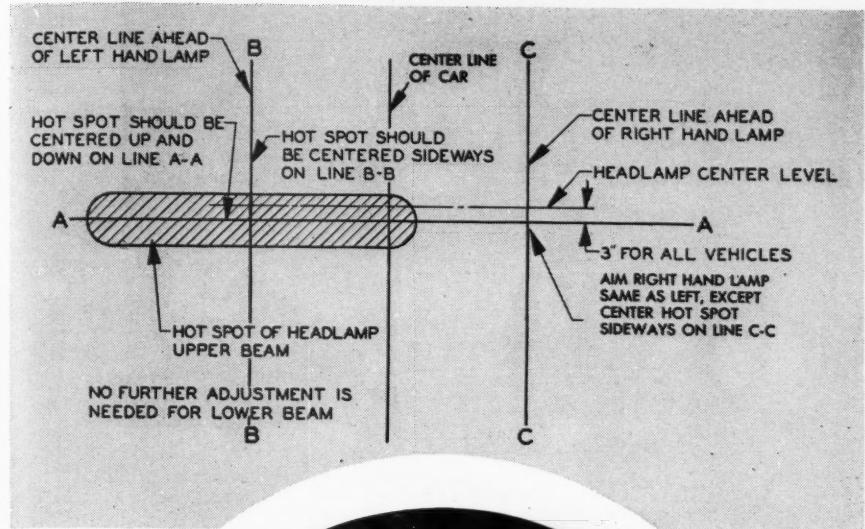
Remove the two lower screws (2 in Fig. 3), one upper screw, and



loosen the other upper screw (1 in Fig. 3) which hold the lower glass run channel.

Remove four screws (3 in Fig. 3) which hold the latch assembly to the door, and also the screw which holds the latch assembly to the inside panel of the door.

Lower the latch assembly and pull it out through the opening in the door panel as shown in Fig. 4. It may be necessary to bend the control bar or strap outward from the door a little so it can be guided out of the opening in the inside panel.



## AIM THE HEADLIGHTS

**It is a job you must do to insure  
good visibility for night driving.  
Here is the way to do it properly**

Center the hot spot of the beam above and below the horizontal line on the chart. This line is placed three inches below the center of the headlight.

**N**OTWITHSTANDING the fact that the headlights of the 1942 model cars are set farther apart and closer to the ground than formerly, no change is recommended in the procedure of aiming them. Except for moving the lines on the aiming screen so that they correspond correctly to the lamp centers, all other operations remain the same.

The first requirement of headlight aiming is that a spot be picked out in the shop where the floor is perfectly level. If the floor is not level for the entire distance from the car to the aiming screen, the lights cannot be properly aimed. If, for example, the lamps are aimed while the front of the car is lower than the back, the result will be a high beam when the car is traveling on a level highway. While this might not show up as being out of line on the screen, it would make a great difference in the normal range of visibility when the car is on the highway.

Place the aiming screen a distance of 25 ft. ahead of the car. Sight through the rear window and over the hood ornament, and place a point on the screen indicating the center of the car. Then measure the distance between the center of the right headlight and the center of the left headlight; transfer this measurement to the screen and locate the vertical lines on the screen so that they correspond with the centers of the headlights. Next, measure the distance from the floor to the center of the headlights, and transfer this measurement to the screen. Place the horizontal line on the screen so that it is exactly *three inches below* the center of the headlights.

Turn the lights on, switching to the upper or country-driving beam. Cover one headlight and aim the other so that the area of greatest light intensity is equally divided to the right and left of the vertical line corresponding to the center of

*(Continued on page 73)*



"There's a piece of equipment," said Pop, "that can tell you as much about a car's innards as anything we've got in the shop."

## SHOOTING TROUBLE WITH A PRESSURE

**A young mechanic gets some hints from Pop O'Neill on how to use the gage and how to interpret what it shows**

*By J. EDWARD FORD*

**“Y**OU'RE absolutely right, Chuck," said Pop O'Neill, running his finger over the head gasket Chuck Masters had handed him. "This leak here explains everything. You couldn't get a high enough pressure readin' on number three cylinder because the pressure was leakin' over into number four."

Chuck grinned, a little pleased with himself for having put his finger on the trouble. "I kinda

## **COMPRESSION PRESSURES ON CURRENT MODELS**

(In pounds at cranking speed with standard head)

<b>BANTAM</b>			<b>FORD</b> —(Continued)			<b>OLDSMOBILE</b> —(Continued)	
60	1939	125	V8-85	1940	100	Custom 6	1941
65	1940	135	DeLuxe & Super	1941	100	Special 8	1941
65	1941	135	6	1942	112	Dynamic 8	1941
			V-8	1942	105	Custom 8	1941
<b>BUICK</b>						6	107
40	1938-39	112	<b>GRAHAM</b>			8	115
60, 80, 90	1938-39	114	96-Special & Custom	1939	120	<b>OVERLAND</b>	
40, 50	1940	112	97-SC. & Custom SC	1939	130	39	1939
60, 70	1940	114	DeLuxe & Custom	1940	125		105
80, 90	1940	114	SC. & Custom SC	1940	130	<b>PACKARD</b>	
40, 50	1941	142				1700	1939
60, 70	1941	151	<b>HUDSON</b>			1701, 2	1939
90	1941	151	90-98 (112)	1939	115	1703, 5	1939
40	1942	112	92-93	1939	120	1800, 6	1940
50, 60, 70, 90	1942	115	95-97	1939	118	1801, 8	1940
			Six & DeLuxe 6	1940	125	1803, 4, 5; Sup. 8	1940
<b>CADILLAC</b>			Super & CC 6	1940	120	1806, 7, 8; Sup. 8	1940
V8-61, 60S	1939	103	Eight & CC 8	1940	119	1900	1941
V8-75	1939	114	Series 10	1941	125	1901	1941
V16-90	1939	119	Series 11, 12	1941	120	1903-04-05	1941
40-60S, 62-V8	1940	105	Series 14	1941	119	1906-07-08	1941
40-72, 75-V8	1940	115	Series 17	1941	119	6	1942
40-90-V16	1940	120	Series 20	1942	125	8	1942
61, 62, 63, 60S, 67, 75	1941	126	Series 21, 22	1942	120		115
All models	1942	126	8	1942	119		
<b>CHEVROLET</b>			<b>LA SALLE</b>			<b>PLYMOUTH</b>	
Master 85	1939	112	V8 39-50	1939	105	P7	1939
Master DeLuxe	1939	112	40-50, 52	1940	105	P8	1939
Master 85	1940	112				P9 Roadking	1940
DL & M&L	1940	112	<b>LINCOLN</b>			P10 DeLuxe	1940
Master & Special	1941	112	401 to 425	1938-39-40	105	P11	1941
1942		112	Zephyr 700, 96H	1938-39	105	Special DeLuxe	1941
<b>CHRYSLER</b>			Zephyr V12	1940	105	P14	1942
C22-Royal	1939	110	Zephyr & Cont.	1941-42	120		125
C23	1939	110	Custom	1941-42	120	<b>PONTIAC</b>	
C24-Custom Imperial	1939	110	<b>MERCURY</b>			38-28DA, 39-28	1938-39
Windsor & Royal C25	1940	110	99A	1939	100	39-25, 39-26	1939
Saratoga & N. Y. C26	1940	115	U8	1940	100	40-25, 26	1940
Crown Imperial C27	1940	115	1941		100	40-28, 29	1940
Royal & Windsor	1941	112	1942		108	41-25	1941
C30N, C30K N. Y.	1941	150				41-26	1941
C33 Imperial	1941	125	<b>NASH</b>			41-24	1941
All models	1942	125	3920-Ambassador 6	1939	100	41-27	1941
<b>CROSLEY</b>			3980-Ambassador 8	1939	100	41-28	1941
A	1940	90	40-20	1940	100	41-29	1941
CB41	1941	80	Ambassador 6-4140	1941	120	6	1942
1942		80	Ambassador 6-4160	1941	125	8	1942
<b>DE SOTO</b>			Ambassador 8-4180	1941	110	<b>STUDEBAKER</b>	
S6	1939	110	Ambassador 600-4240	1942	120	G-Champion	1939
S7	1940	110	Ambassador 6-4260	1942	125	9A-Commander	1939
S8	1941	120	Ambassador 8-4280	1942	110	5C-President	1939
S10	1942	125				Champion	1940
<b>DODGE</b>			<b>NASH LAFAYETTE</b>			10A-Commander	1940
D2, D5, D8	1936-38	110	3910	1939	110	6C-President	1940
D11	1939	110	4010	1940	110	3G-Champion	1941
D14-D17	1940	110				11A-Commander	1941
D19	1941	110	<b>OLDSMOBILE</b>			7C-President	1941
D22	1942	125	60	1939	105	Champion	1942
<b>FORD</b>			70	1939	105	Commander	1942
922A-V8 (60 Hp.)	1939	105	80	1939	105	President	1942
91A-V8 (85 Hp.)	1939	100	6-60	1940	105	<b>WILLYS</b>	
V8-60	1940	105	6-70	1940	105	38, 48	1938-39
			Custom & Cruiser	1940	105	440	1940
			Special 6	1941	115	American 441	1941
			Dynamic 6	1941	115	Americancar	1942

# GAGE



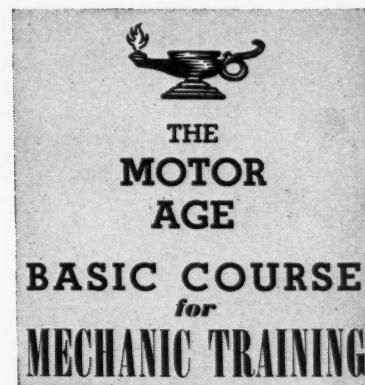
figured that might be what was wrong," he said. "But I'm not used to handlin' the pressure gage yet. It's kind of tricky."

"You'll get onto it after a while," said Pop. He put down the gasket on its edge so that it leaned against the bumper. Then he walked over and picked up the pressure gage which was lying on the running board.

"There's a piece of equipment," he said, "that can tell you as much

about a car's innards as anything we've got in the shop. The only thing is, it's like a woman. You can tell what she's sayin' but you don't always know what she means." He paused till he saw Chuck's brow pucker slightly. He knew then that he had aroused the kid's attention and went on.

"What I mean is this: Anybody can see the needle swing around on a pressure gage and see where it stops. That tells us how much



pressure we've got in a cylinder. But that's all it will tell you, unless we use our heads, like you did on that leakin' head gasket. If you hadn't been lookin' for that leak or hadn't noticed it, you might have torn the whole engine down lookin' for bad rings or valves or pistons."

"It's easy to tell when the pressure ain't high enough, though," said Chuck. "I could tell the trouble was in number three or number four, because the pressure was all right in the other cylinders."

The kid was learning fast, Pop decided, chuckling to himself. Any time that Jim, one of his veteran mechanics, decided that a ship-yard job was too good to be missed, Chuck would be pretty near ready to step into his shoes.

"That's right," said Pop. "You can tell when pressure is low. But I'll bet my Willkie button this gage didn't say, 'Look for a leaky gasket' when you put it on number three and four cylinders."

Chuck shook his head a little sheepishly.

"That's what I'm drivin' at," went on Pop. "There are a lot of things that affect pressure. You've got to know what they are before you can translate what the gage says.

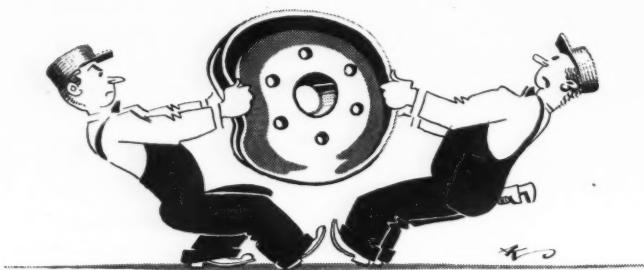
"In the first place, the pressure even in a cylinder where everything is perfect ain't what you might expect. Take this job you're workin' on. The compression ratio is roughly 6 to 1. You'd think the compression pressure would be six times the pressure of the atmosphere, which is 14.7 pounds per square inch at sea level. But it ain't. It's several pounds less."

"The pressure of the atmosphere gets less the higher up you go, don't it?" said Chuck.

*(Continued on page 66)*

# POINTERS ON WHEEL STRAIGHTENING

**An added service that will bring profits into your shop despite the threatened shortage of parts**

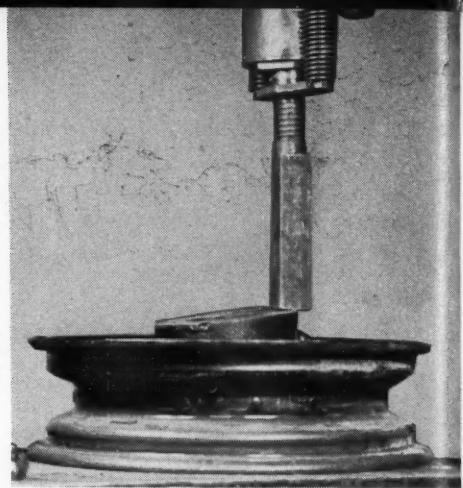


**By BOB HANKINSON**

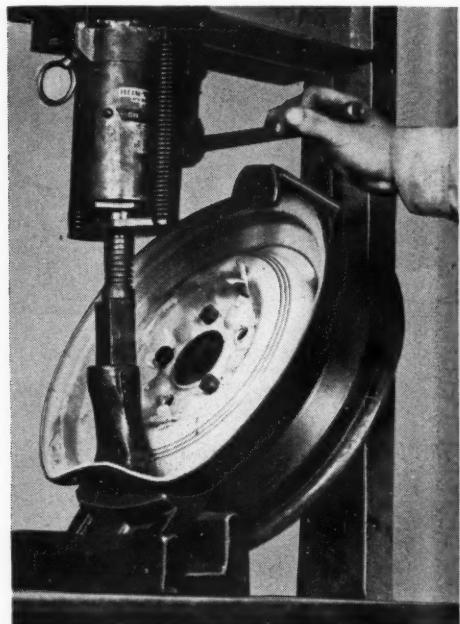
VERY few cars which figure in a wreck escape without damage to the wheels. Since the wheels of modern cars are made of pressed steel, they can be straightened if the proper equipment is available. A hydraulic press, with the necessary adaptors to conform to the contour of the hub and the rim, and special bending tools constitute an outfit that will handle all makes and models of pressed-steel wheels.

The operation of straightening a wheel consists of a series of bending and pressing forces applied through the hydraulic press and with the adaptors, which fit dies conforming to the shape of the particular part of the wheel to be straightened. A little practice with the equipment will soon result in skillful operation and enable the average mechanic to turn out a first-class job on both passenger car and truck wheels.

*Staff photographs through courtesy Kay Wheel Sales Co., Philadelphia, Pa.*

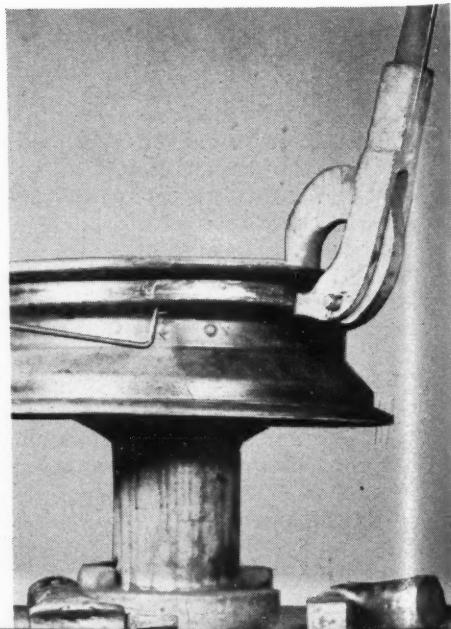


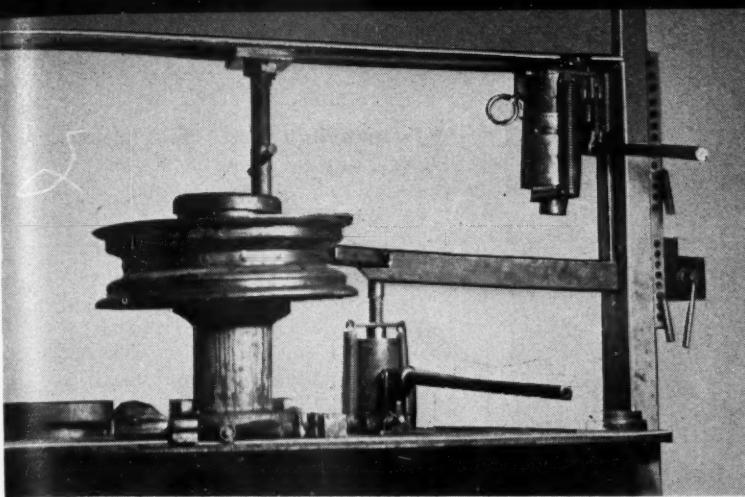
1. Mounting flange bent. With wheel flat on bed of press, install mounting ring adaptor and apply pressure to force flange into place.



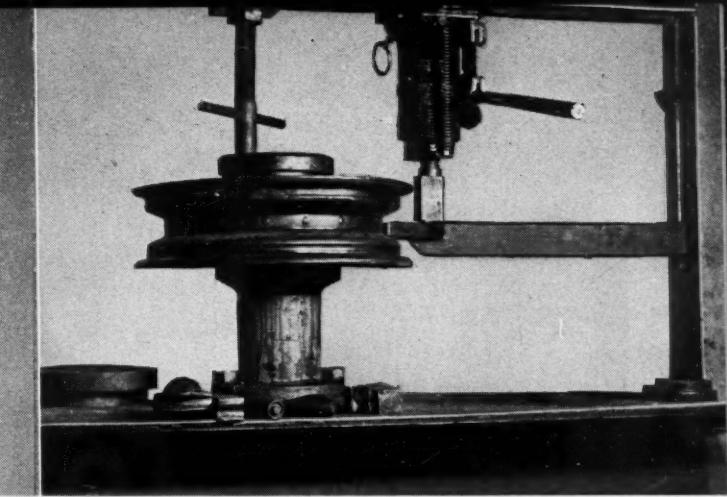
4. Tire flange bent. Mount wheel on rim anvil and use inner rim adaptor first, to force drop-center shoulder into correct position.

8. Use this wrench for correcting bends in tire bead seat flange. Spin wheel to check trueness with pointer attached to side of press.



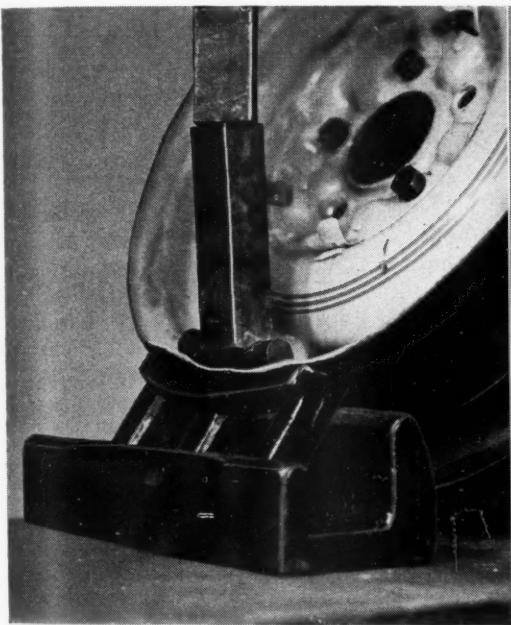


2. Mount wheel on revolving stand and hold with overhead screw jack. Place side arm in center of wheel rim and force up with portable jack. By alternating between this

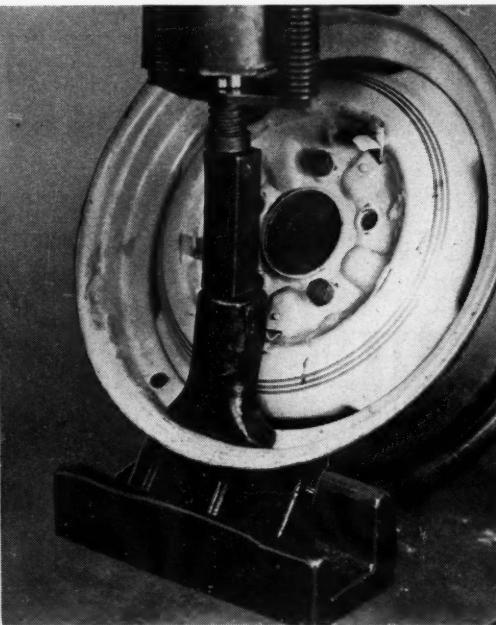


operation and the first and third operations illustrated, it is possible to restore the mounting flange to its original condition and also to true up the distorted bolt holes.

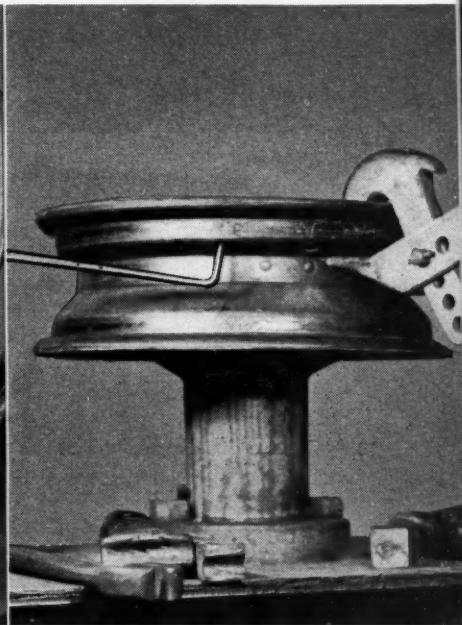
3. With same side arm extension, apply pressure downward with overhead jack to true mounting flange with drop-center of wheel rim.



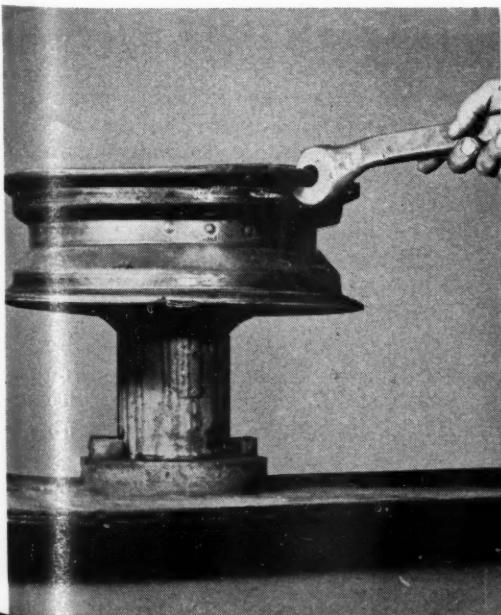
5. Use tire flange adaptor next. Shift wheel so tire flange bears on anvil, and force flange into position, covering damaged area.



6. Alternate between drop-center shoulder adaptor and rim flange adaptor until damaged section is pressed back into normal position.



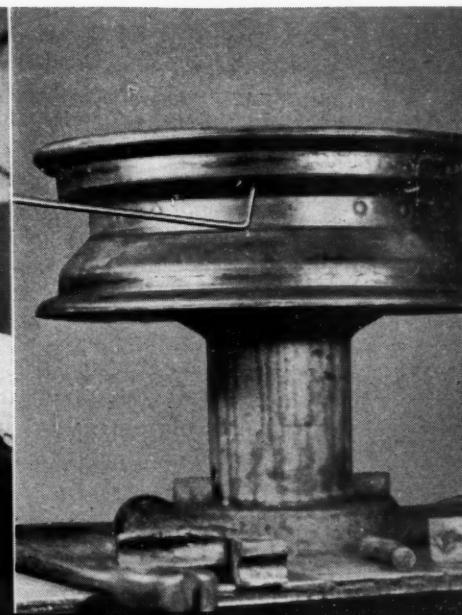
7. Attach wheel to revolving mounting stand and check lateral runout. Use this wrench for correcting from drop-center to shoulder.



9. Make final corrections to tire flange with this wrench, bending up or down as necessary to remove waves, and eliminate lateral run-out.



10. As a final operation, use hammer and dolly to smooth out wrinkles in edge of tire flange and provide smooth surface for tire sidewall.



11. Completed job. Wheel now has no lateral run-out in drop center flange or tire flange, and no radial run-out in tire bead seat flange.



# BATTERIES

## BOOST REPAIR BUSINESS

**A shop finds that customers will pay for battery service when it's good and available 24 hours a day**

**A**LL you have to do is stick your head in the door of Automotive Service, Inc., Wilmington, Del., to realize that you're in a shop that does a tremendous amount of battery selling and service. Along the right-hand wall as you enter are shelf after shelf of owner batteries, waiting to be called for or delivered. Along the other wall is the charging line,

often with as many as 27 units being recharged by three chargers. Inside the office, display stands hold a dozen or more batteries of various sizes and types, and new batteries, still unpacked, make an imposing pile in one corner. You're ready to accept, by this time, the shop's claim to doing probably the biggest battery business in the city.

Responsible for this unusual volume is just one fact. That fact is service, 20 years of it.

It was in 1921 that V. B. Dawson went into the general repair business in Wilmington, operating under the name of Automotive Service. Taking on a line of batteries, he soon discovered that automobile owners develop an interest in batteries at only one time. That is when their old battery dies. And when it does, they want service, and they want it instantly.

This lesson was learned well. During the next several years, the Automotive Service shop offered the best and promptest service it could. General repairs increased so much that the shop had to be moved to larger quarters and three years later it was still growing and was moved to its present location at 606 Walnut Street. Battery business has more than kept pace with the rest of the operation.

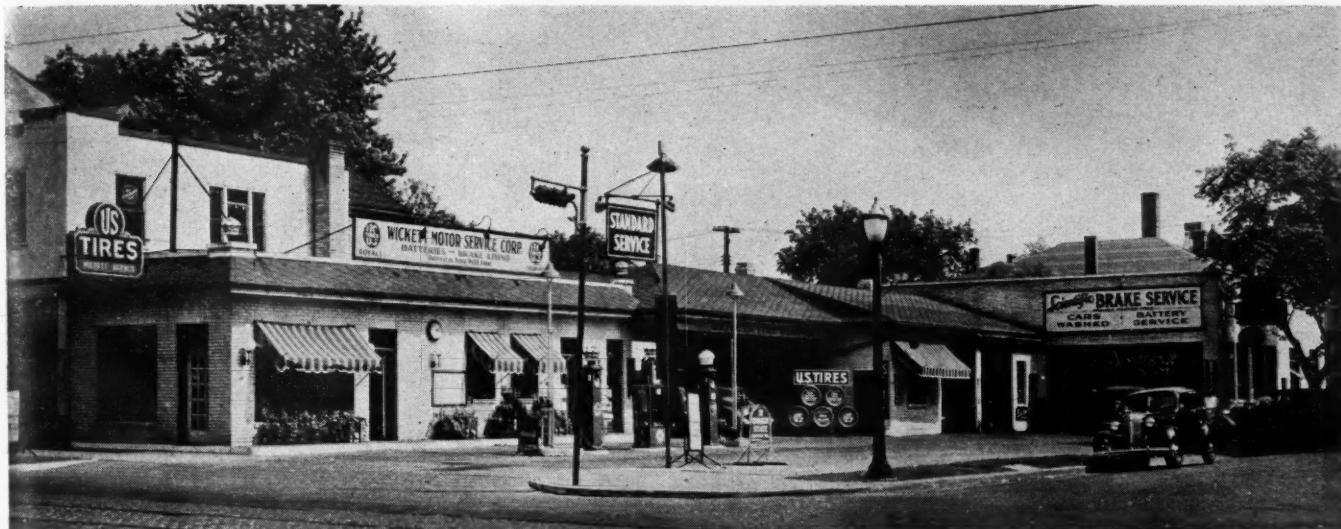
At present, as for many years past, battery service is offered 24 hours a day. Let an owner get stuck any hour of the night or day, in the city or close to it, and a phone call will bring an Automotive Service truck in a hurry. The mechanic-driver of the service truck is not just a handy man; he can cope with ignition, fuel line, and minor troubles, if it turns out that it is one of these things rather than a weak or dead battery that has to be taken care of.

Some general repair shops miss out on battery sales because they consider road service, battery-rental service, testing and so on too expensive. For some reason they assume that these services must be given away. If this were necessary, it might be argued that the gross profit on the sale of new batteries could not cover the expense. Automotive Service has shown that these services do not have to be given away.

A headache in operating a battery department is the loss of rental batteries. Recently Automotive Service overcame this entirely by slapping a \$2 deposit on rental batteries. This is returned to the customer, of course, when the rental unit is brought back. Since the deposit has been required, owners don't forget to return rental batteries.

Even road service need not be given away, Automotive Service has found. During the day, no charge is made but after 6 p. m.

*(Continued on page 69)*



## INDEPENDENT

### REPAIR SHOPS MAKE

**\$450,000,000**

**Census figures reveal tremendous volume of their service business**

EVEN a swift glance at the government's comprehensive Census of Business is enough to indicate the colossal proportions of the retail automotive business. During 1939, the year for which the study was made, wholesale, retail, and service firms in the automotive field did a combined business of almost \$16,000,000,000. Of this imposing sum, roughly \$9,000,000,000 represented retail sales and service. National income that year amounted to a bit more than \$69,000,000,000. The public, therefore, spent more than 13 per cent of its income for the purchase, maintenance, and operation of its motor vehicles.

The repairman's share of this market is tremendous. The man-

ner in which statistics were compiled makes it impossible to determine the exact amount of service sold because the service business of automobile dealers was lumped with his other sales. The chief clue to service volume is the figures given for independent shops. These accounted for an aggregate volume of \$450,000,000. It must be remembered that these figures are for 1939, a year when service business was considerably less thriving than it is today.

The study classifies the various types of shop according to the kind of work that predominates. Thus a shop listed as a brake shop is one in which brake service predominates but the volume of business it does is not necessarily all

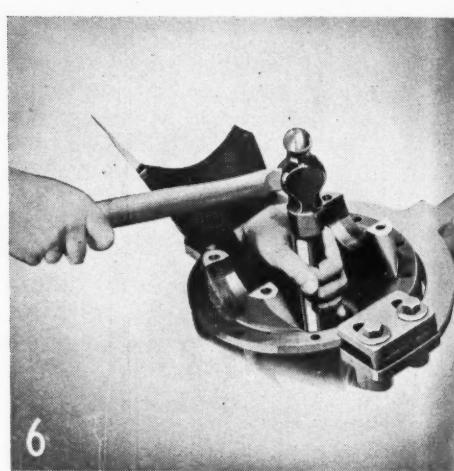
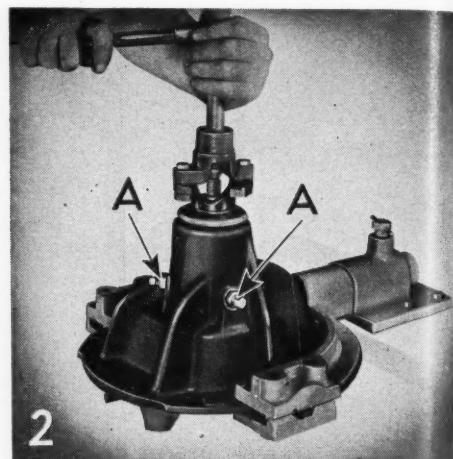
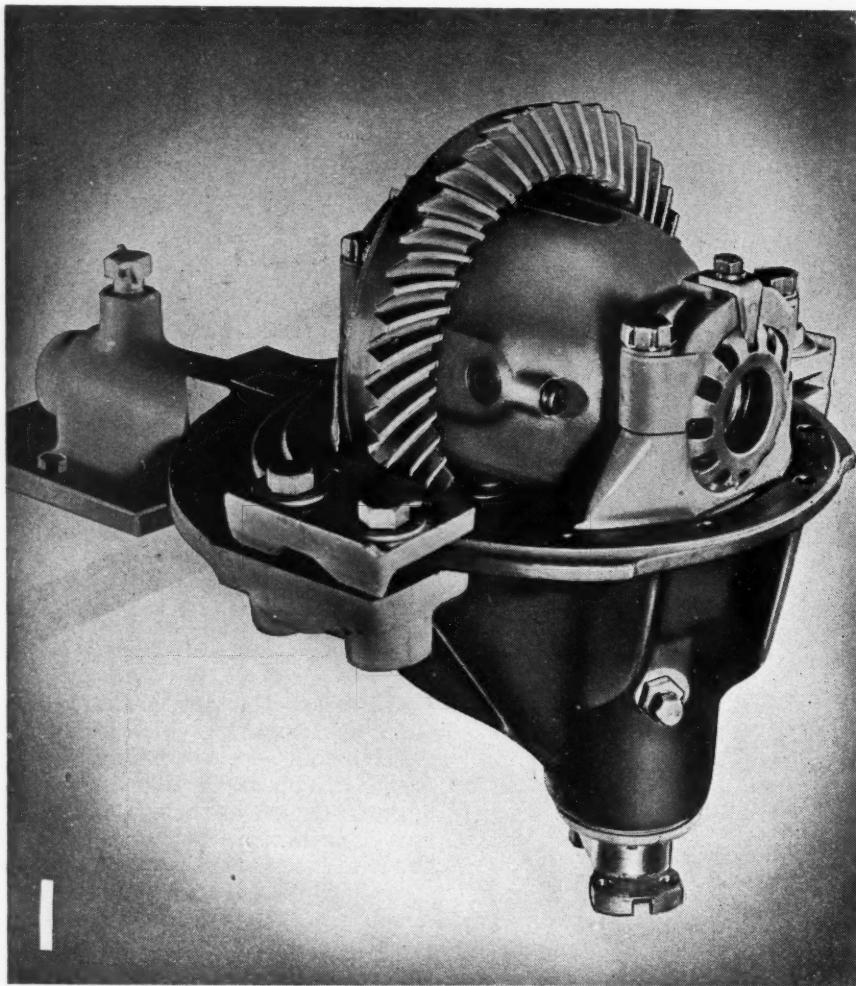
brake work. Further, brake work done by shops in which battery and ignition service predominates does not appear in the study as brake work. Nevertheless, the volume done by the various types of shops is interesting, since it indicates in a general way the type of set-up that can expect to do the greatest amount of business. Here are some of the figures:

Brake repair shops.....	\$4,876,000
Car laundries .....	2,941,000
Paint shops .....	6,220,000
Radiator shops .....	4,631,000
General repair shops.....	228,214,000
Storage garages .....	70,315,000
Top and body repair shops.....	44,678,000
Battery and ignition re-	
pair shops .....	10,228,000
Tire repair shops.....	8,222,000
Wheel, axle, spring shops	5,040,000

The remainder of the \$450,000,000 was spent by owners for parking, car rental, and miscellaneous services.

These figures do not, of course, represent the whole market for maintenance and operation of automobiles. Dealers in accessories, tires, and batteries accounted for a combined volume of \$523,000,000, and filling stations sold \$2,822,000,000 in gas, oil, and services.

Probably the most significant fact brought out in the study is that the general repair shop does the bulk of the service business. Individually, a shop that specializes may prosper to a greater degree than an individual general repair shop, but the statistics would indicate that the complete shop generally gets more of every type of service.



The mechanical procedure in this and other articles in Motor Age supplements the Service Section of the Chilton Flat Rate and Service Manual, the book used by 26,000 maintenance shops.

1. Remove the differential assembly from the axle housing, wash it in a cleaning solvent to remove all grease, and mount the unit in a holding fixture on the bench. Scribe a mark on the bearing caps and adjusting nuts to indicate location of adjustment and to identify right and left hand parts. Remove the bearing cap retaining bolts, caps and adjusting nuts, and lift out

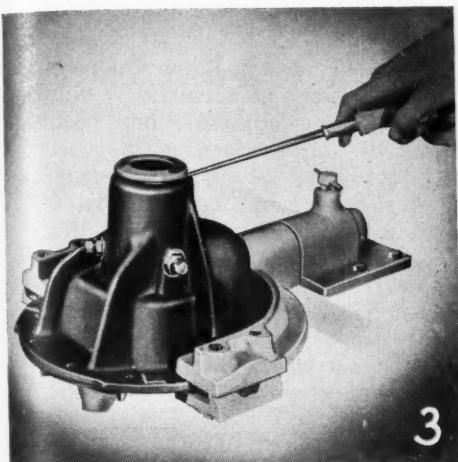
the ring gear and case in the housing.

2. Remove the pinion shaft retaining nut. Use a puller to remove the universal joint companion flange from the pinion shaft. Press the pinion shaft out of the housing, being careful not to damage the shaft threads or the oil retaining washer. Remove the pinion shaft bearing wedging screws, "A," and press the double row ball bearing, the sleeve and the roller bearing out of the housing. Wash the bearings in cleaning solvent and examine for roughness or excessive looseness. Note: The double row ball bearing should be snug, with no looseness that would permit the pinion shaft to float endwise. A slight amount of freedom is permitted in the roller bearing.

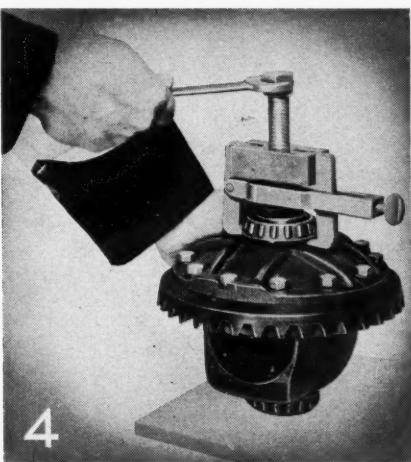
3. Remove the oil seal from the housing

by prying with a blunt tool. Examine the surface of the companion flange for nicks or roughness which could cause wear of the oil seal leather. When installing a new seal, oil the leather washer with engine oil.

4. Remove differential pinion shaft, pinions and axle gears and examine teeth for wear. Black surfaces on thrust washers is not cause for replacement unless parts are pitted or corroded. Inspect fit of carrier bearings on hub of case, and, if loose, the case should be replaced or the hubs should be copper-plated to provide tight fit. Inspect bearing rollers for roughness by first oiling the rollers and then pressing the outer race over the rollers and turning it with a steady pressure. If roughness is felt, bearing should be replaced. Use puller to remove carrier bearing from case hub.



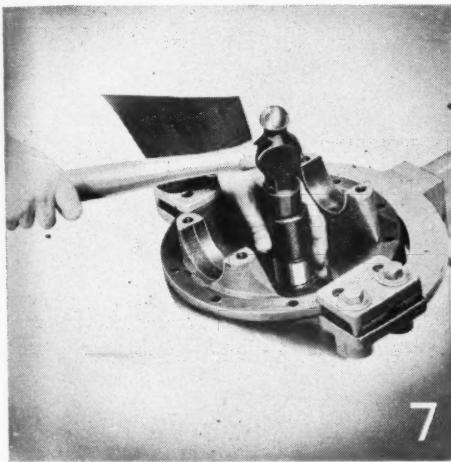
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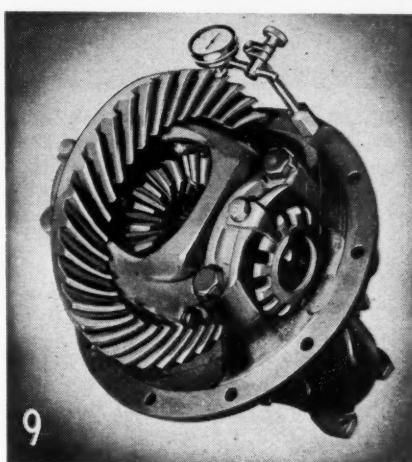
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Photos courtesy of Pontiac Motor Co.

## SERVICE

### Pictures you'll be glad to have when you overhaul the rear end of a 1942 Pontiac

5. When installing new carrier bearings, use driver to bear against inner race only. Driving against the roller will damage the bearing. The driver should be used so that the inner race will not become "cocked" as it is driven on to the hub.

6. Place the companion flange spacer washer inside the carrier and against the oil seal. Install the pinion shaft double row ball bearing firmly against its seat in the housing, using a driver as illustrated. Install the pinion double row ball bearing sleeve in the carrier bore with the flat end against the pinion bearing. Install the bearing wedging screws, being sure that they are uniformly tight, and lock with the jam nuts.

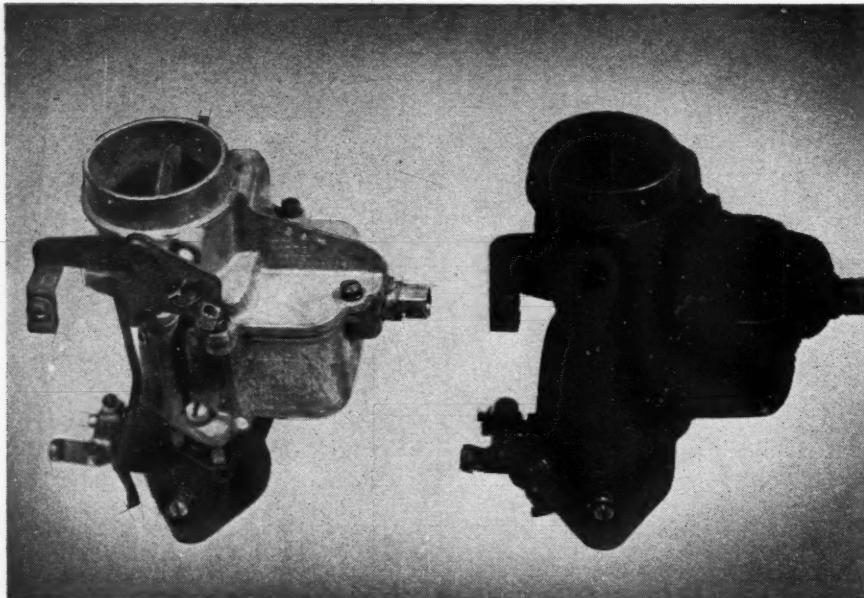
7. Install the roller bearing outer race

firmly against its seat in the carrier bore, using driver as illustrated. Install the pinion rear bearing spacer over the pinion shaft and against the back of the pinion. Install pinion shaft, and press the pinion and shaft assembly through the bearings. Install the universal joint companion flange, being sure the cotter pin hole is opposite the joint flanges, and tighten the nut.

8. Reassemble the differential unit into the case and install the case and ring gear assembly into the housing. Put the bearing adjusting nuts in place, and install the caps and draw the cap bolts down tight enough to hold the adjusting nuts in place. With the ring gear moved over against the pinion so that the backlash is just taken up, tighten the bearing adjusting nuts alternately, one and then the other a little at a time. These

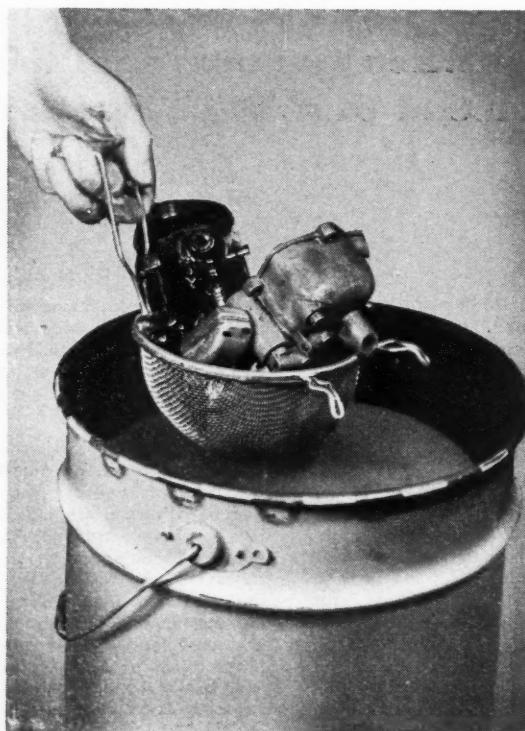
nuts should be tightened in easy stages until the bearing outer race starts to turn with the adjusting nut. From this point, each nut should be tightened not less than two nor more than four notches.

9. When proper tension has been applied to the carrier bearing adjusting nuts, adjust the backlash between the ring gear and pinion. Clamp a dial indicator to the housing as shown, and rock the ring gear to obtain a reading on the gage. Make the adjustment by turning the carrier bearing adjusting nuts one notch at a time, loosening one and tightening the opposite one, and checking the dial gage reading each time. Final adjustment should show backlash to be not less than .003 in. and not more than .012 in. Install bearing adjusting nut locks.



Carburetor before and after cleaning by the cold-immersion process. Parts are submerged in the compound, as shown below, and allowed to soak for approximately one-half hour.

## CARBURETOR CLEANING



MANY a complaint of poor engine performance, with poor gasoline economy, has been cured by simply cleaning the carburetor. Jets, valves and passages in the carburetor become coated with carbon, gum, varnish or dirt in one form or another. In this condition it is impossible to properly adjust it, but, if this foreign material is properly cleaned out, the carburetor can be accurately adjusted so it will give standard performance.

The difficulty, of course, has always been that it is an extremely difficult job to clean out the passages and jets of a carburetor because they are so inaccessible. This difficulty has been overcome by the development of cleaning compounds that are capable of cleaning out these foreign deposits, even in the most inaccessible places. There are many such compounds on the market which are easy to use because they require no special equipment, can be used cold, are not inflammable and are not injurious to the various metals used in the construction of a carburetor or to the hands.

Many of these cleaners are supplied in containers which can be used as the cleaning tank. The compound is used full strength, so there is no mixing necessary, thus eliminating what otherwise might be a messy job. The sediment cleaned from the parts settles in the bottom of the container, while the compound retains its full strength. Periodically it can be poured off into another container, the sediment cleaned out of the original can, and the compound poured back for further use.

The carburetor to be cleaned should be completely disassembled; that is, the idle adjusting screws, float needle valve and seat, and all plugs which are used to close the ends of passages, should be removed so that the cleaning solution can penetrate into all parts of the carburetor. The leather of the accelerating pump and any electrical units of the automatic choke should not be immersed in the solution.

All other parts should then be placed in a wire basket or strainer and immersed in the solution so as to be completely submerged. The length of time required to do a good cleaning job depends upon the type of solution being used, and just how dirty the parts are. It ranges from 15 to 30 min. normally.

(Continued on page 69)

# WOMEN WILL DO THE BUYING

**It will be their job to keep the family car running when husbands join up**

**Says ROSE LU GOLDMAN**



**L**ET'S face it: Things are different. War is making fundamental changes in our business world. Not only are raw materials and finished products altered, but our present markets are vastly different from those we faced in '38 and '39.

One of the most marked of these changes is evidenced by the growing importance of women as the nation's money-spenders. Our Army is asking for 10,000,000 men. Our Navy is to be the world's largest. Men are going to be needed and these men will come from your town and my town. Their wives, their sisters, yes, even their daughters in some cases, will remain at home—and become the money-spenders of these war years. Heretofore, if a business man didn't want to be "bothered" to cater to women, he could find an ample market among the men of his community. But that won't be so true in these next few years. Not only that, but, as happened in the last war, many of the tasks women are forced to assume out of the necessity of the war will be kept by women in the years to follow.

Wise merchants, recognizing this trend, are directing sales appeals to feminine interests. Wise service men will do well to acknowledge it, too; and, because our industry has been loath to admit this importance of women, there is still room for the alert man to get in on the ground floor. There isn't a single community where a well-thought-out campaign selling automotive service to women wouldn't be financially successful.

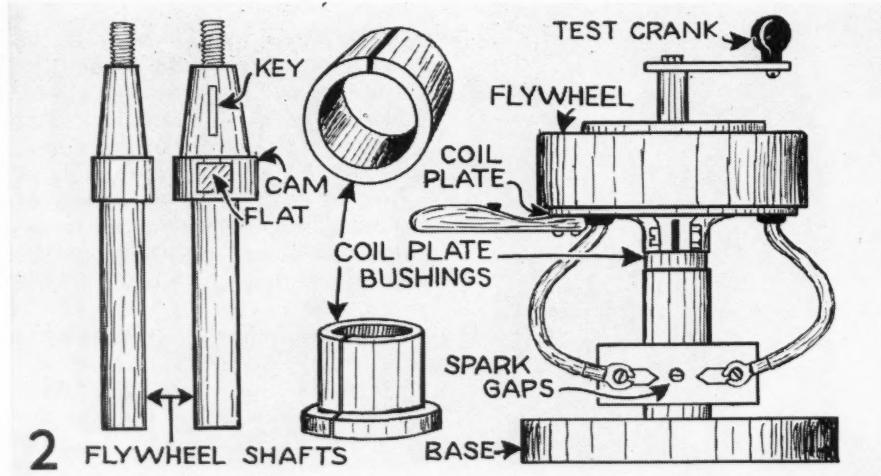
Before we can successfully appeal to these women, however, we must understand their attitude toward automotive service and car care.

To the average woman, buying automotive service is like buying meat. She has learned that it pays to patronize a good, reliable butcher, for a meat's tenderness and flavor can rarely be judged by

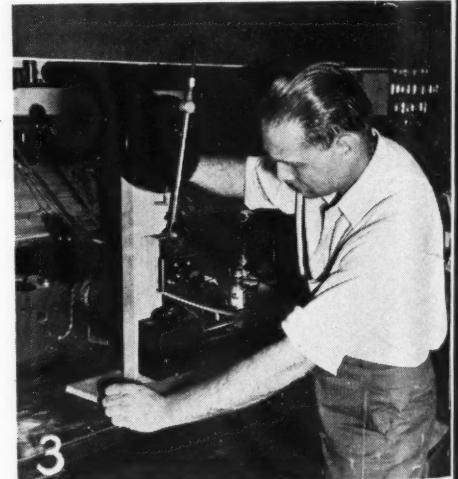
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Magneto being tested on bench in author's shop. He points out in this article that a test bench is a necessity for intelligent magneto work.

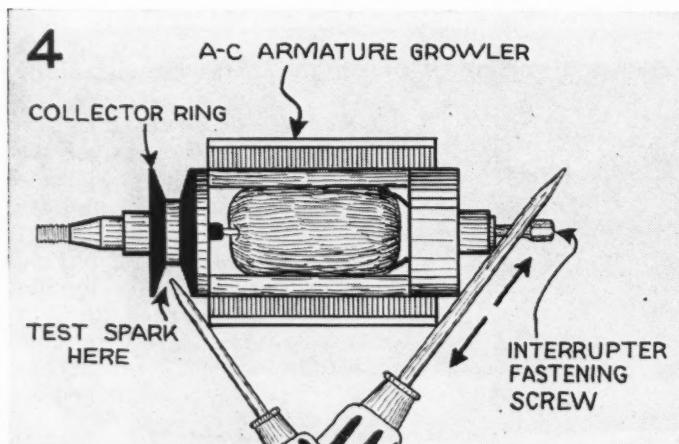


Details of a test fixture for checking the operation of magnetos of the flywheel type.

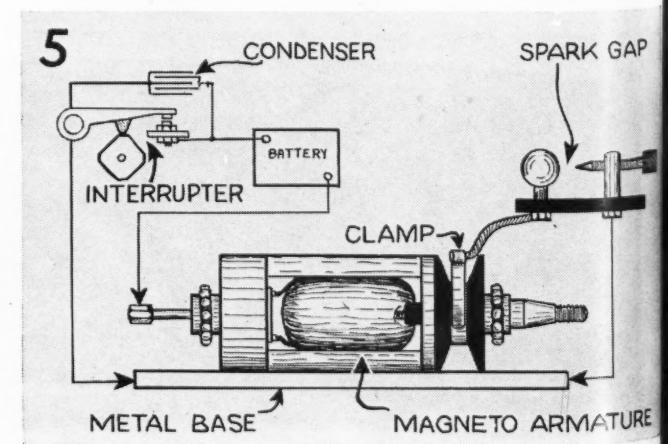


Test stand used for type EK Wico magnetos.

This test for shuttle-wound armatures uses a generator armature growler. Circuit diagram of battery-operated unit for testing coils.



4 A-C ARMATURE GROWLER



5

# EASIER MAGNETO TESTING

Foreseeing an increase in magneto service,  
an expert explains some of its basic facts

OLD-TIMERS remember when plenty of cars had magneto ignition. Then cars all switched over to battery ignition and for a long time magnetos were just about as dead as the dodo bird. But not today! Right now there are far more magnetos in use than ever before and the factories are turning them out on a mass-production basis.

Newer men in the automobile repair business don't know so much about magnetos but they will have to learn, for magnetos are coming back fast. Not on cars or ordinary trucks, but in airplanes, tractors, emergency lighting plants, stationary engines, outboard motors and for dozens of other uses. Uncle Sam is using them by the hundreds of thousands and a lot of the boys are going to come back from the Army

By **FRED SLOANE**

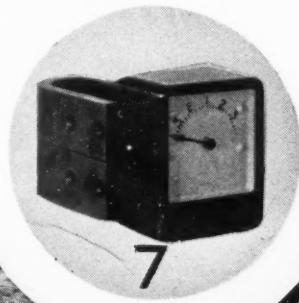
and Navy with a healthy respect for magneto ignition.

Magnetos lost out on car and truck ignition for a number of reasons. One was first cost. It is more expensive to make a precision magneto than a battery ignition system. Another reason was lack of skilled magneto service men. Almost any handy man can get a battery ignition system to working—at least after a fashion—but not a magneto. Still another reason was in starting. It is often hard to start an engine with magneto ignition unless the magneto is fitted with an impulse coupling. Years ago, when they were using magneto ignition on cars, they didn't have impulse couplings—to

make starting easy—and when these impulse couplings did arrive the objection was that they made too much noise for passenger cars. So the result was that magnetos sort of faded away except in those few applications where the utmost dependability was essential in the ignition system.

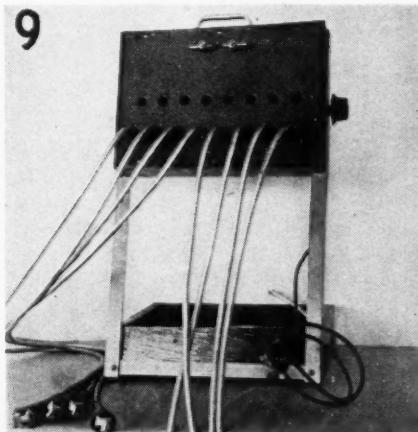
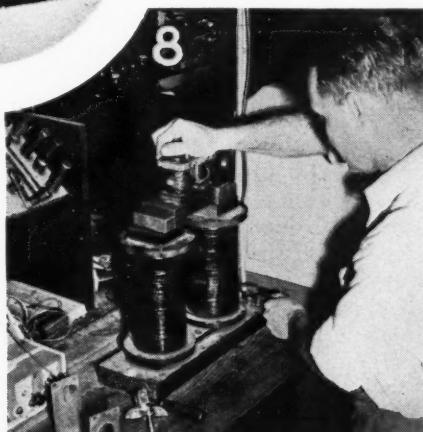
Just about the time magnetos were being forgotten along came the growing demand for farm tractors, small gasoline engines for a number of purposes, and airplanes. Now, with this all-out re-armament in full swing, we're seeing plenty of magnetos again, and somebody is going to have to service them all, now and for a long time to come. We've always serviced some magnetos along with our electrical work, but from now on this type of service is going to

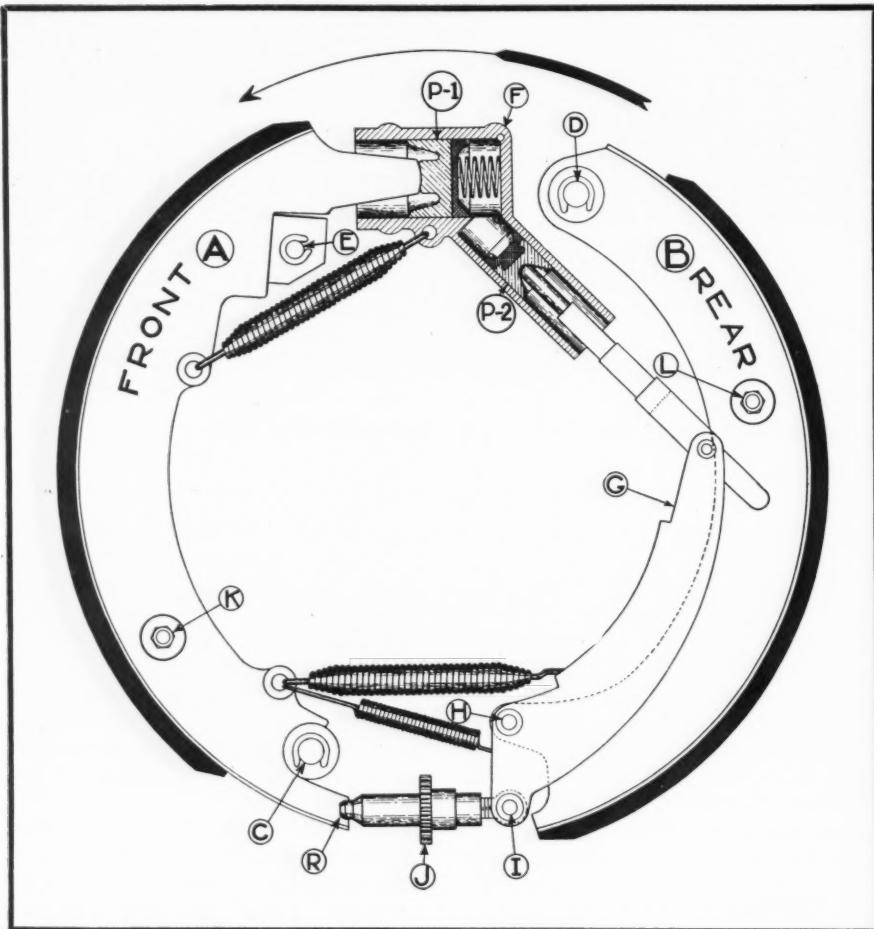
(Continued on page 58)



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Left, meter for testing degree of charge of a magnet. Below, left, testing magneto coils. Below, center, using a three-circuit super magnet charger. Below, right, adjustable spark gaps used in testing magnetos.





# HI-TORK BRAKE ADJUSTMENT

**In servicing this Wagner hydraulic  
brake, used on some International  
trucks, these tips will be helpful**

THE Wagner Hi-Tork hydraulic brake differs in design, operation and in the adjusting procedure from the conventional Wagner two-shoe brake.

As shown in the illustration, the brake consists of two shoes, "A" and "B." Shoe "A" is supported on the backing plate by the anchor "C," and shoe "B" is supported by anchor "D." The wheel cylinder

"F" differs from the conventional in that the piston "P1" operates the front shoe while a smaller piston "P2," operating in a cylinder offset from the main cylinder, operates the lever "G" through the pivot pin "H" and the adjusting link and pin "I."

When pressure is applied to wheel cylinder "F," the piston "P1" moves outward to force the

front shoe "A" against the drum. At the same time, pressure is applied to piston "P2" which operates lever "G." This lever pivots at point "H" and is anchored to the adjusting link at "I" which pushes against the front shoe at "R." This leverage forces the rear shoe "B" out against the drum, operating simultaneously with the front shoe.

To perform a minor adjustment, loosen the lock nut on anchor "E" and turn the pin in the direction of forward wheel rotation until the shoe drags on the drum. Then back it off until a .012 in. feeler gage can be inserted between the lining and the drum at a point 1½ in. from the upper or toe end of the shoe. Tighten the lock nut.

Insert a screw driver through the adjusting hole in the brake backing plate, and turn the star adjusting wheel "J" by moving the handle of the screw driver upward toward the center of the wheel until the brakes drag. Then back it off until a .012 in. feeler gage can be inserted between the drum and the lining of the rear shoe at a point 1½ in. from the lower or toe end of the shoe.

When installing relined shoes, the anchor pins "C," "D" and "E" should be turned to their fully released positions, and the star adjusting wheel "J" should be backed off to its fully released position.

After the drum is installed, insert a .012 in. feeler gage between the lining and the drum at a point 1½ in. from the upper end of the front shoe. Turn the anchor pin "E" in the direction of forward wheel rotation until the gage is just free. Then move the drum inspection hole to within 1½ in. of the lower end of the same shoe and insert an .008 in. feeler gage between the lining and the drum. Turn anchor pin "C" in the direction of backward wheel rotation until the gage is just free. Tighten both anchor pin lock nuts.

Install a .012 in. feeler gage between the drum and the lining at a point 1½ in. from the lower end of the rear shoe, and adjust the star adjusting wheel "J" until the gage is just free. Move the drum inspection hole to the upper end of the rear shoe and insert the .008 in. feeler gage between the lining and the drum, 1½ in. from the end of the shoe. Turn the anchor pin "D" in the direction of backward wheel rotation until the gage is just free. Tighten the lock nut on anchor pin "D."



**"Your battery must be a little weak!"**

# NEW profit makers

## PARTS    TOOLS    EQUIPMENT

## ACCESSORIES

### *Lox-On Wrench*



Patrick-McDermott Co., 2704 S. Hill Street, Los Angeles, Cal., has announced a line of box wrenches which can be locked on the nut or head of a bolt while the other end of the bolt or nut is being turned. This eliminates the need for an extra man or helper when working in restricted areas. The locking is accomplished by an inner shaft, turned by the hexagonal handle, which locks the socket firmly on the nut. Wrenches are supplied in sizes from  $\frac{1}{4}$  to  $\frac{3}{8}$  in., and are sold singly or in kits of five.

### *Soldered Connections*

A new product known as "Jiggers," has been announced by Jiggers, Inc., 215 W. Illinois Street, Chicago, Ill. It is a small, self-contained soldering unit, containing the right amount of 50-50 solder and flux hermetically sealed within a waterproof heat-generating outer shell. To obtain a soldered connection, it is necessary only to push the wire splice into a Jigger, and touch a lighted match to the Jigger. The shell ignites and produces the proper temperature to flow the solder into the splice. The burned

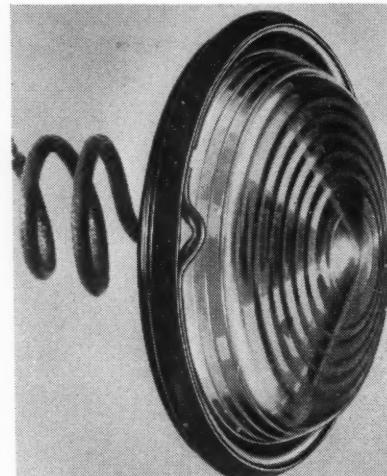


shell is then dropped off, leaving a smooth soldered connection. As a special introductory offer, the manufacturer is offering to send free samples of Jiggers upon request.

### *Clearance Light*

As part of its 25th anniversary silver jubilee, the K-D Lamp Co., 610

W. Court St., Cincinnati, Ohio, is placing on the market a new clearance or side marker light. The entire lamp body is made of a single piece of metal, with a connector tube spun rigidly in position. The lens is of plastic, and is cup-shaped in design for side visibility as well as projected distribution of light. Its total depth is less than 1 in. Red or amber lenses are available.

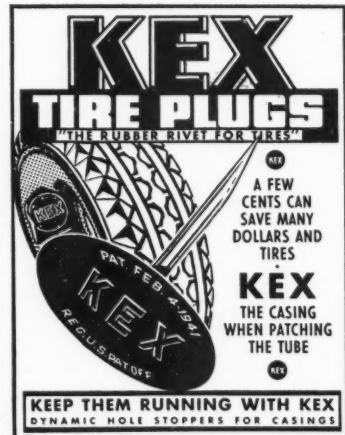


### *Tire Tool*

Weaver Mfg. Co., Springfield, Ill., has developed a hook-type tire tool for loosening the tire bead from the rim. It can be used on all drop-center rims without danger of marring either the rim or sidewall of the tire, according to the manufacturer. The tool is inserted between the tire and the rim; a sidewise motion is then used to loosen the bead.

### *Tire Plug Display*

The Wedler-Shuford Co., 2222 Olive St., St. Louis, Mo., is distributing to their jobbers and dealers an attractive display card for window or counter use, illustrating the KEX tire plug. Designed to plug holes made in the casing by nails, etc., the KEX plug seals the opening, prolonging tire life by keeping water, mud and dirt from working into the break. Plugs are sold in various sizes for truck, bus, trac-



tor and passenger cars. Display card and a sample KEX plug will be sent free of charge upon request.

### *Hi-Rate Battery Charger*

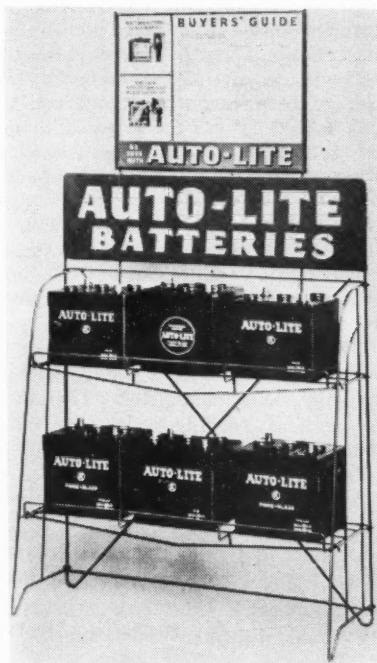
From the Marquette Mfg. Co., Minneapolis, Minn., comes the announcement of a new Hi-Rate battery charger, incorporating a battery con-



dition indicator and a high-rate discharge switch. Made in two sizes, one without the individual cell test and the high rate discharge switch priced at \$179.50, and the larger model with the individual cell test and the high rate discharge switch priced at \$210. Each model is mounted on large rubber tires, and comes complete with 20-ft. power cable and 10-ft. leads.

### Battery Display Rack

The latest in display and merchandising aids developed by The Electric Auto-Lite Co., Toledo, Ohio, is a battery display rack of welded steel rod. It is made in two sizes, to accommodate four or six batteries, and is finished in red and green enamel. Above the rack is a "Buyer's Guide" in chart form, listing the correct Auto-Lite battery for each year model and make of automobile.



### Bean Has New Wheel Balancer

John Bean Mfg. Co., Lansing, Mich., has a new wheel balancer which shows not only where to put the weight to restore balance, but also how heavy a weight to use, and the speed at which the unbalance occurs. When placed on the balancer and spun with the wheel spinner, a bell in the balancer rings when the point of greatest unbalance is reached. At that point, the location of the balance weight and amount of weight needed is indicated by the machine.

### Deep-drawer Cabinet for Storage

The Standard Pressed Steel Co., Jenkintown, Pa., has introduced a steel drawer unit with deep drawers



for mechanics or factory workmen to use for storing tools and other equipment. Drawers are 20 x 20 x 6 in., and are provided with individual locks. The complete cabinet is 52 in. high.

### K-D Clearance Light

A new "armored" clearance and side marker light has been announced by the K-D Lamp Co., 610 W. Court St., Cincinnati, Ohio. The housing and lens are locked into one compact assembly so that the lens or the screws cannot drop out when changing bulbs on the road. There is a separate steel back plate with fiber gasket which attaches to the truck body. The lens is designed to throw strong, glareless light ribbons visible at any angle up to 180 deg. The lamp operates on a 1 1/2 candlepower bulb. Red or amber colored lenses are available.



### Valvoline Has New Lubrication Handbook

A new 64-page lubrication handbook has been released by Valvoline Oil Co., 5th & Butler Sts., Cincinnati, Ohio. The new manual contains lubrication recommendations for crankcase, transmission and differential, wheel bearings, water pump, universal joint and clutch-release bearings for passenger cars; crankcase, differential, transmission and final drive recommendations for tractors; and oil recommendations for aviation, industrial, marine, bus and motorcycle engines. Includes all passenger car models from 1937 to 1942, inclusive.

### Hose Clamps

A complete line of hose clamps is offered by the Actus Products Corp., Mount Vernon, N. Y. One is a universal clamp that is adjustable from 1/2 in. to 3 in., known as the Wrap-lock clamp; another a high-pressure aviation-marine clamp for use on fuel and oil lines. All clamps are high-grade steel, cadmium plated.

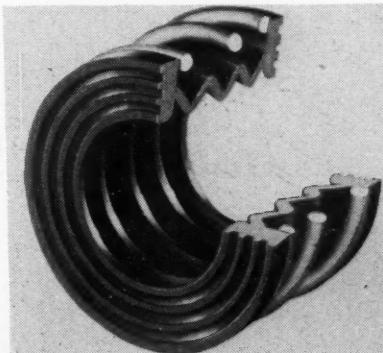


### Ramco Offers Tune-Up Tools

Tools that help the mechanic do a faster and better job are being offered at a special price by the Ramsey Accessories Mfg. Corp., 3693 Forest Park Blvd., St. Louis, Mo. They are a new timing light and a torque wrench. The torque wrench aids in proper tightening of the cylinder head after a ring job, and the timing light enables the mechanic to show the customer the actual condition of the ignition system, and the need for a tune-up. Details of this special offer can be obtained by writing the manufacturer.

### New Water Pump Seal

The Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill., has announced a new bellows-type seal for water pumps. It consists of the bellows, made of synthetic rubber compound with superior resistance to the action of grease, oil, alcohols and anti-freeze compounds, and a coil spring. The bellows contacts the washer and driving base with a serrated surface, and the spring holds the sealing surfaces in place. The seal does not touch or have a sliding contact with the shaft.





**BLACKOUT.** A California girl covers the headlights of her car with blue tissue paper to comply with war-time regulations.



**RADIO BRAKE.** Receiving set attached to motor, left, reduces speed of a car at intersections when it picks up automatic signal. Right, studying the sending set.

**REPAIR WOMEN.** Capt. Betty Hall, left, and Miss Janet Moore, Massachusetts civilian defense workers, repair their own car.



**WATER COURSE.** Fording a stream was too much for the motorcycle at left. This spot was only one of many hazards faced by contestants in 13th annual reliability run of the Yonkers, N. Y., Motor Cycle Club. A surprising number survived the gruelling test.

# NEWS

## VICTORY

A hundred airplanes or so, sneaking out of a Pacific dawn, have transformed American business and business thinking. With the first crash of bombs at Pearl Harbor, business men, like all other Americans, ceased to think of individual problems and individual advantage. In that moment, all differences and criticism were obliterated by the firm resolve to do everything and anything necessary to achieve swift and decisive victory over Japan and the other members of the Axis mob.

Trying times lie this side of victory. All business, big as well as little, must be prepared to sacrifice profits, competitive position, and in some cases perhaps even existence. It is a big price to pay but business men have already shown that they do not consider it too big if it brings victory. All of us must give up many privileges and not a few rights. In yielding them, we must remember that they do not exist in the world outside the democratic countries. Because we are democratic, we can regain them as readily, when the band

of international goons has been smashed, as we relinquish them.

The automobile industry has already set an admirable example of cooperation with the war effort. Car factories have turned to the production of arms with a determination that will be an inspiration when the saga of America's war against the Axis is finally sung. Its production, now that fighting has begun, will be enlarged beyond all previous conceptions.

Distributors and retailers will be asked to do their part. In great measure, this will consist of doing without—without adequate labor, without materials, without goods to sell. It is not going to be easy; as on the fighting front, there will be hardship and casualties. In most cases, these sacrifices will be made gladly, and in any case they will be made. It will not be merely a matter of patriotism but of recognizing that the present struggle against totalitarianism and all the suppression, regimentation, and human indignity that this system implies is a life-and-death struggle for American liberty.



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## DETROIT LETTER

By ED. WARNER

The whole automobile industry—country shop, big city dealer, jobber, manufacturer—will echo the words of the Automobile Manufacturers Association:

"The automobile industry accepts without question the additional curtailment ordered by the government. Only the government is in position to know the needs of the nation in this emergency, and to take steps necessary and adequate to meet them. This industry accepts that leadership, pledging its full resources and all-out effort to the war program."

That is the spirit, the voluntary teamwork that sustains a free people in their struggle against dictator-ridden Germany and Italy and feudal Japan and guarantees their ultimate triumph over savagery.

### FUEL QUALITY

IT was pointed out by MOTOR AGE several months ago that the diversion of materials to defense might lead to a lowering of gasoline quality. This was based on the experience of Britain, where the little gasoline owners can buy is all one grade, the so-

STARTLING announcement by the OPM on New Year's day finally answered the question of what is to become of automobile production in war time. So far as passenger cars and light trucks are concerned, there is to be none. Until production of cars and light trucks ceases, probably about Feb. 1, all stocks of these vehicles will be frozen, the OPM order indicated, to avert a buyers' rush for the 450,000 vehicles now estimated to be in dealers' hands. A rationing plan will be introduced about Jan. 15 to regulate the disposal of these cars and trucks.

A meeting of OPM officials and manufacturers will be held Jan. 5 to decide when production would cease.

January production, it was announced, will be 200,000 units, practically double the last previous quota set for the month. Heavy trucks, needed by the Army and war industry, will be increased.

Until the New Year's day order was issued, it was felt that the rubber shortage would be a governing factor in future production of new cars and trucks. About 95 per cent of the crude rubber used by the United States comes from Malaya and the East Indies, where the rubber plantations are now being overrun by the Japs. Dribbles of crude originate in the Amazon valley, in Africa, and in the guayule plantations of Mexico.

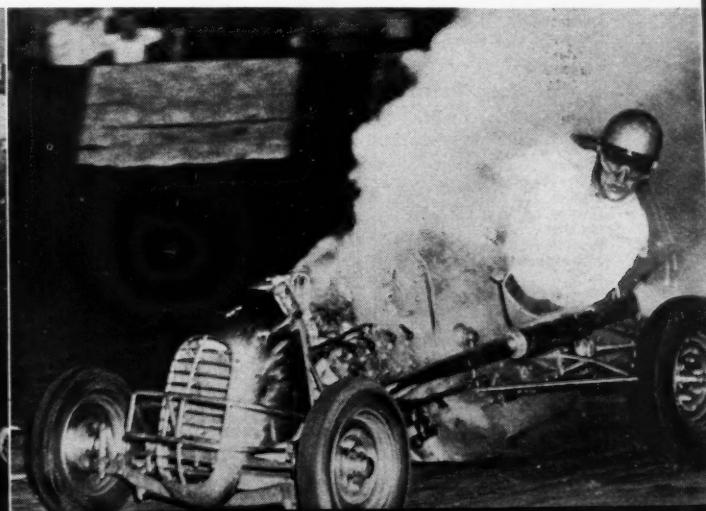
(Continued on page 70)

called "pool petrol". Japan's cowardly attack has suddenly imposed war-time restrictions on all production for civilian use, and high-octane gasoline is one of the first products to feel the effect.

Petroleum Coordinator Ickes has assumed close control of all 100-octane fuel for aviation. No aviation gasoline may be made, sold, or shipped without his approval. Furthermore, anti-trust laws are set aside to enable

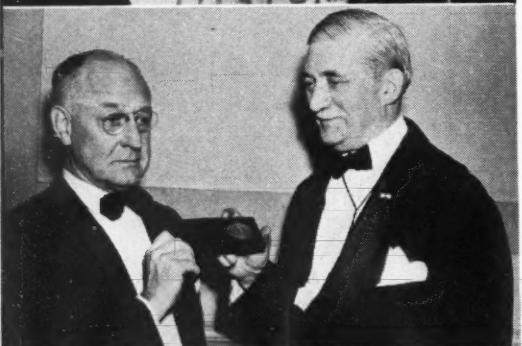
DRINKS ON THE STATION HOUSE. Eager "guinea pigs" line up for free drinks in Kansas City, Mo., as police begin road tests of the behavior of drivers after imbibing too freely.

NERVE. Buddy Berz, of Lexington, Ky., stays with his midget racer after motor explodes in Kansas City race. The mishap occurred near finish, and Berz, badly burned, finished fourth.





# NEWS



refiners to pool their operations to increase the production of aviation-grade gasoline.

It is interesting to note in this connection that  $7\frac{1}{2}$  times as much 100-octane gasoline is being produced today as was used of all aviation grades three years ago. Present production amounts to 2,100,000 gallons a day. With contracts already let for 25 new plants, capacity will be tripled within the next year or 18 months.

The demand for high-octane aviation fuel is only one of the reasons for lowering the anti-knock quality of gasoline intended for civilian use. Just as important is the demand for lead, which forms the basis of anti-knock compounds. Not only are larger quantities of the compounds needed for aviation fuels but lead itself is

vital in countless other phases of war production. Consequently the supply available for making anti-knock compounds has been reduced sharply. Production of the Ethyl Gasoline Corp., which controls the sale of tetra-ethyl lead, was cut recently to 60 per cent of capacity. During January, February and March refiners will be able to obtain only 70 per cent as much anti-knock compound as they used during the same period last year. The effect upon the performance of civilian cars has already become generally noticeable, since it is estimated that 85 per cent of all gasoline sold contains anti-knock compound. Some refiners use it in all grades; a few do not use it at all.

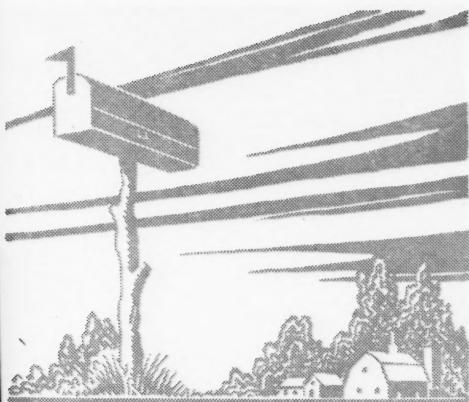
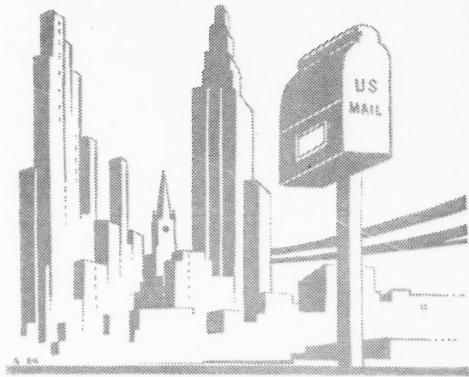
Straight-run gasoline up until a few weeks ago had an octane rating of about 75. Many refiners have already lowered the tetra-ethyl in their product to 72 and even 70. It is probable that the rating of so-called ethyl grades also has been lowered.

The public will probably ask servicemen a great many questions about these war-enforced changes. Some of them fear that the mileage of their cars will be reduced by lower-octane fuel, and others will want to eliminate the pinging that is certain to increase.

On the question of mileage, there is little need for concern. It is no  
(Continued on page 71)

## October New Passenger Car Registrations

	OCTOBER	SEPT.	OCTOBER	TEN MONTHS		Per Cent Change, 10 Months, 1941 over 1940	Per Cent of Total Ten Months		ONE MONTH MODEL YEAR		
				1941	1940		1941	1940	1941	1940	Per Cent Change
	1941	1941	1940	1941	1940		1941	1940	1941	1940	
Chevrolet	40,243	20,236	71,689	809,392	692,522	+ 16.9	23.86	24.91	40,243	71,689	- 43.9
Ford	24,670	22,708	41,761	548,300	441,523	+ 24.2	16.16	15.88	24,670	41,761	- 40.9
Plymouth	21,052	20,526	41,517	415,125	365,020	+ 13.7	12.24	13.13	21,052	41,517	- 49.3
Buick	10,588	5,927	32,283	276,980	238,804	+ 15.9	8.16	8.59	10,588	32,283	- 67.2
Pontiac	12,054	6,521	22,576	258,124	186,855	+ 38.1	7.61	6.72	12,054	22,576	- 46.6
Oldsmobile	7,832	4,129	18,627	207,927	159,629	+ 30.3	6.13	5.74	7,832	18,627	- 479.5
Dodge	10,455	10,806	10,273	195,326	163,883	+ 19.2	5.76	5.90	10,455	10,273	+ 1.8
Chrysler	5,812	5,770	6,486	132,008	78,994	+ 67.1	3.89	2.84	5,912	6,486	- 8.8
Studebaker	6,194	5,695	10,113	101,568	85,477	+ 19.4	2.99	3.08	6,194	10,113	- 38.8
De Soto	4,450	4,297	4,820	83,242	58,844	+ 41.5	2.46	2.12	4,450	4,820	- 7.7
Mercury	3,395	2,498	4,759	73,051	65,577	+ 11.4	2.15	2.36	3,395	4,759	- 28.7
Nash	3,398	2,319	2,534	70,990	42,262	+ 67.9	2.09	1.52	3,398	2,534	+ 34.1
Hudson	4,149	5,238	8,044	66,214	67,694	- 2.2	1.95	2.44	4,149	8,044	- 48.4
Packard	6,082	4,860	7,046	80,256	62,303	- 3.3	1.78	2.24	6,082	7,046	- 13.7
Cadillac	2,728	1,210	3,971	53,411	28,658	+ 88.4	1.57	1.03	2,728	3,971	- 31.3
Willys-American	1,135	1,395	1,418	20,407	17,990	+ 13.4	.61	.65	1,135	1,418	- 20.0
Lincoln	969	604	1,859	16,417	17,400	- 5.6	.48	.63	969	1,859	- 47.9
Crosley	136	177	48	968	369	+ 159.6	.04	.01	136	48	+ 183.3
Graham	12	13	201	531	1,526	- 352.0	.02	.05	12	201	- 503.0
Bantam	5	16	44	125	745	- 83.2	.....	.03	5	44	- 186.3
Miscellaneous	26	348	426	1,909	3,513	- 45.7	.06	.13	26	426	- 689.7
Total	165,485	125,293	290,495	3,392,231	2,779,586	+ 22.0	100.00	100.00	165,485	290,495	- 43.1
Chrysler Corp.	41,869	41,399	63,096	825,701	666,741	+ 23.8	24.34	23.99	41,869	63,096	- 33.6
Ford Motors	29,034	25,810	48,379	637,768	524,500	+ 21.6	18.80	18.87	29,034	48,379	- 40.0
General Motors Corp.	73,445	38,023	149,146	1,605,804	1,306,466	+ 22.9	47.34	47.00	73,445	149,146	- 50.8
All Others	21,137	20,061	29,874	322,958	281,879	+ 14.6	9.52	10.14	21,137	29,874	- 29.3



Bill Toboldt, Editor, Motor Age

## THE READERS'

# CLEARING HOUSE

## of Servicemen's Queries

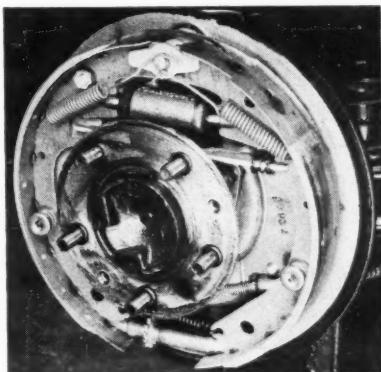
### BRAKES GRAB ON ONE WHEEL

*I am having brake trouble with a 1940 Oldsmobile 6. The brake on the left rear wheel grabs. It did not do this until after I relined the shoes.*

*I used a good grade of lining, and the brakes were all right for about 2000 miles, and then the left rear started grabbing. I changed the brake shoes, wheel cylinders and brake drums, but left rear still grabs. I also flushed out the hydraulic brake system.*

*Finally I relined the shoes with a softer grade of lining. After another 2000 miles the same trouble returned, just as though there was grease on the lining. I have checked the lining and it looks perfectly clean, and the adjustment is right. C. L. Church, Hickory, N. C.*

**T**HE description of the trouble has all the earmarks of grease on the lining. A loose backing plate, or a loose anchor pin, would cause a chattering noise but would not necessarily lead to brake grabbing. The fact that the brakes operate satisfactorily for a time after you work on them, and



then start to grab, is a typical description of a condition brought about by grease on the lining. I have seen cases where simply handling the brake lining with dirty hands was enough to cause brake grabbing after the lining had been in service for a few thousand miles.

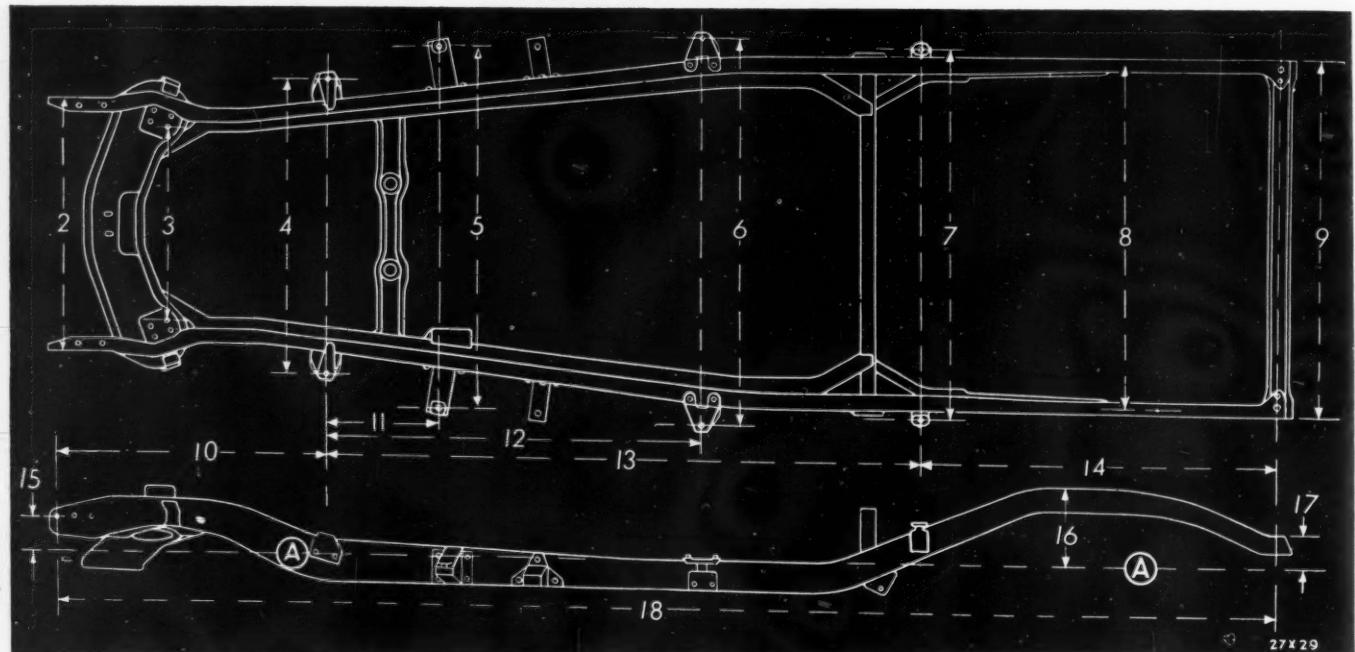
One thing you should do is to be absolutely sure that there is no grease leak at this rear axle shaft that will permit grease to come out on the brake backing plate. Also you should be sure that the brake drum (not only the brake lining contact area of the drum but the entire drum) is perfectly free from oil or grease. Also,

you should be sure that when new lining is installed, the contact surface is not handled. It is surprising how little grease is required to develop a grabbing condition.

I suggest that you install new shoes and lining in this wheel, and that you check carefully the brake backing plate to be sure it is tight to the axle housing, and also that you carefully check the brake shoe adjustment. These shoes should be adjusted so that there is .015 in. clearance between the top and the bottom of the lining on the secondary shoe and the drum. This clearance is obtained by adjusting the anchor bolt. Then expand the adjusting wheel in between the two shoes until the shoes contact the drum so that it takes two hands to turn the wheel over. Then back off the adjusting wheel approximately 20 notches so that the shoes are free of the drum.

### ENGINE KNOCKS

*Have customer with '41 Chevrolet which pings badly. Ignition timing was set on flywheel mark but the car still pings and rattles. This car has 6000 miles and owner states it has always given this trouble. When you step on accelerator, vacuum at dis-*



1942 Plymouth Frame Diagram

(Dimensions Given in Inches)

A—top line of frame

2—34

3—26 25/32

4—40 17/32

5—50 3/4

6—51 (52 3/8, 2-dr. sedan and coupe)

7—50 1/2

8—46 3/4

9—48 1/4

10—37 7/32

11—15 29/32

12—50 1/32 (59 1/32, 2-dr. sedan and coupe)

13—79 29/32

14—48 7/8

15—4 27/32

16—10 13/16

17—4 7/8

18—166

tributor grabs it right now. Could you give me some remedy on this trouble?—Marrowbone Garage, Marrowbone, Ky.

THIS car appears to be very sensitive to the grade of gasoline being used. I think the thing to do in this case is, first, to set the distributor points at .018 in. gap and then adjust the gas selector so that the car will operate properly for that grade of gasoline. It may be necessary to disregard the mark on the flywheel insofar as ignition timing is concerned. Timing this engine so that it will perform with the gasoline available seems to me to be more important than timing it for the ignition point as indicated by the flywheel and then getting poor performance because the owner does not use gasoline with an octane rating high enough to give the kind of performance he wants.

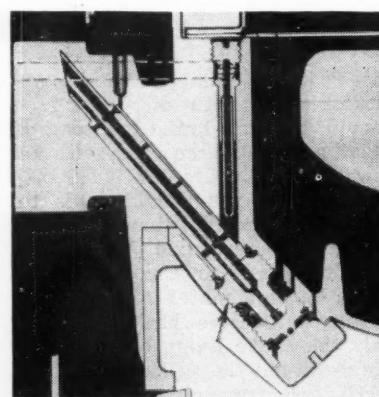
### GAS CONSUMPTION

I have a 1936 Series 40 Buick on which I am having trouble with the carburetor. I would like to know if smaller jets will help save gas. Car is now giving about 12 to 14 miles per gallon. Other 1936 Buicks that I service go 17 and 18 miles per gallon. I would like to have the size of the smallest jet that would be practical to use. Also the size jet which was standard equipment. I would also like to know the float setting. This car is

not driven over 50 miles per hour. I would also like to know if the automatic choke can be changed to open sooner. This car runs and idles well but the complaint is too much gas.—Knutson Garage, Hutchinson, Minn.

THIS car was originally equipped with a Stromberg Model EE-1 carburetor and used a .048 main metering jet.

If you are sure that all the other factors contributing to gasoline consumption have been properly corrected and still you wish to obtain an increase in miles per gallon, I suggest you install a main metering jet size .044. The fuel level in the bowl of the carburetor should be 15/32 inch from the top edge of the bowl to the fuel, measured with the bowl cover off and the engine running.



When adjusting the automatic choke, first be sure that the link connecting between the choke operating lever and the choke valve in the carburetor is of the proper length to connect between the center hole of the lever on the choke and the lever on the carburetor when both are in the full down position. It may be necessary to bend this connecting rod to obtain the proper adjustment.

It is possible to increase the action of this automatic choke by turning out the metering pin which is located in the top of the choke unit.

### IS IT USING OIL?

One of our customers has a Buick that is fouling plugs and smokes badly, but the oil level in the crankcase does not drop. We did a valve job on this car not long ago, and the pistons showed signs of oil getting by them.

Because the oil level does not drop in the crankcase, I cannot convince the owner that he needs new rings, although I feel certain that a ring job would correct his trouble. Can you explain how an engine could use oil and yet not show consumption in so far as the level in the crankcase is concerned? Harold H. Chittenden, North Adams, Mass.

THIS condition could very well exist, particularly in cold weather. You know, of course, that condensation takes place inside the engine at

a much more rapid rate during cold weather than during warm weather. This condensation of oil and water vapor, being a liquid, naturally adds to the level of the oil in the crankcase, making it appear as though oil was not being used. An analysis of the oil in the crankcase, however, will show a much higher percentage of water than under normal conditions.

Naturally, oil that is diluted with water is not so efficient from a lubricating viewpoint, and unless the oil is changed frequently it is likely to be one of the causes of excessive wear in the working parts of the engine. When starting a cold engine in cold weather, it is increasingly important that good lubricating oil be carried to all the working parts just as quickly as possible. This is to prevent excessive wear, particularly with respect to piston rings and cylinder walls. If the oil in the crankcase does not have its full lubricating value, it is natural to expect that these parts will develop more rapid wear.

Under present conditions, when automobiles particularly will have to last much longer than they did a few years ago, it is important that any condition which would contribute to unusual wear be corrected as soon as possible. Already existing, the parts shortage will undoubtedly become more acute as time goes on, and I think any owner is being smart if he has his car put into as good condition as he can right now, while there are still parts available to do the job.

## HIGHER COMPRESSION RATIO

*I have a 1940 Ford V-8, 85, with steel pistons and sleeves. How much can I safely plane off the heads of this job to increase the compression ratio? Capt. Ned T. Norris, Fort Knox, Ky.*

**I**N general, the maximum amount which you can plane off the cylinder head of a 1940 Ford is  $3/32$  in., in order to increase the compression ratio. However, I would like to call your attention to the fact that Ford has special high-compression heads available and I would suggest that you contact the local Ford dealer in order to get prices.

## REAR AXLE HUM

*I have had about eight years' experience in garage work but have had only mediocre luck in adjusting differentials. I have a '35 Dodge that I have had down no less than six times, used two sets of new gears, all new bearings and wheel bearings. Once we took it to a gear-setting specialist who used "mikes" on it and I still have a "hum" when the car is on the drift from 35 to 15 m.p.h.*

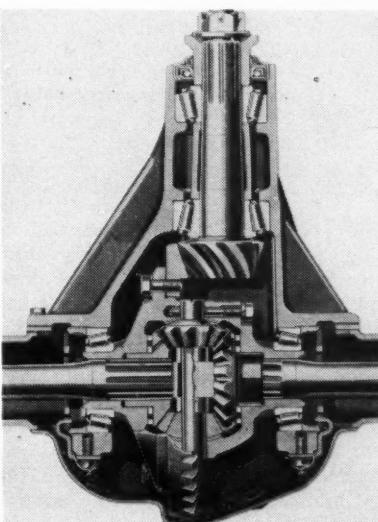
*In using red lead to set these gears, I would get only a small bearing surface showing on the pinion gear when*

*"Sometimes I think Jim carries this horseplay too far."*



*the marks on the ring gear were O.K. so, when I adjust it to get a full bearing on the pinion gear, the ring gear has only a small bearing surface showing. I've tried it both ways and the noise shows little variation. The noise came in while the original gears were in it; they never broke up. I have had the case turned in a lathe, checked the transmission and tried several types of tires for tire noise. The only thing I haven't tried is the differential housing. Do you believe it could be sprung?—Supreme Auto Service, Los Angeles, Cal.*

**J**UDGING from your description, in that the noise appears on a deceleration, it would seem to indicate that the pinion is set too far into the ring gear. My suggestion is that you try removing one shim to set the pinion a little further away from the center of the ring gear to see if this will not correct the trouble. Then I would be sure to check the back lash between the ring gear and pinion and see that it is set to not less than  $.006$  in. and not more than  $.008$  in. I realize that there are some differentials which are noisy in spite of everything you can do. Usually, when this condition is encountered, it is due to a production problem which occurred when the



pinion gear and ring gear were lapped. In those cases, there is nothing that can be done to remove the noise.

It is possible that the differential housing could be sprung but such a condition is so rare that I do not believe it is at all likely.

## WANTED: MORE PEP

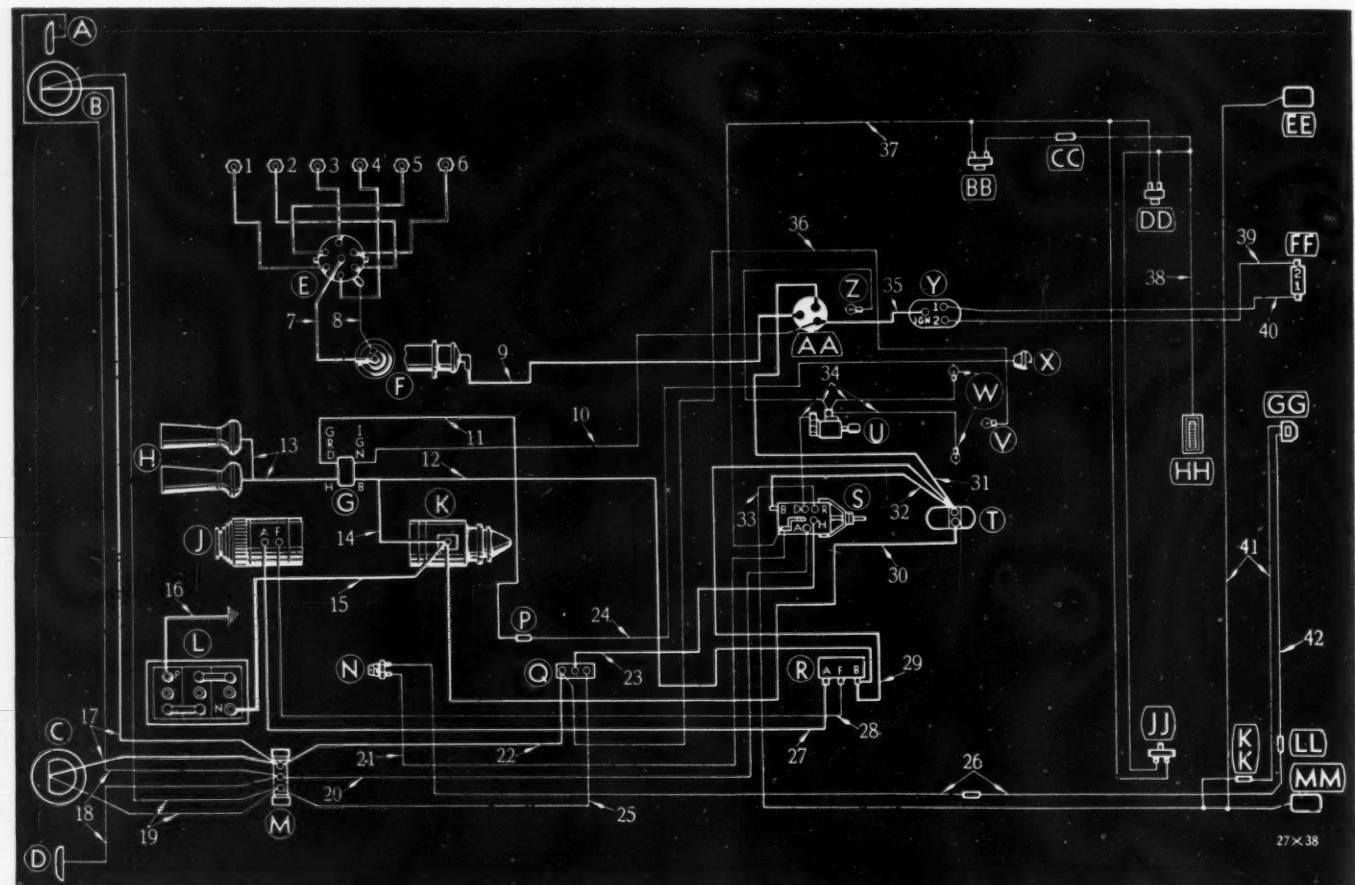
*We have a 1933 Auburn eight to soup up. The customer wants two downdraft carburetors installed, and the head planed. Can you give us any helpful or critical information on this job?—Austin Brooks, San Jose, Calif.*

**T**HIS car has a 5.25 to 1 compression ratio at the present time and this can be increased to 6.2 to 1 by planing off the head.

The way to find out how much material to plane off is to work out a formula to determine the contents of the cylinder head in cubic centimeters. In this particular case, I have worked out the formula for you and I find that, in order to have a 6.2 to 1 compression ratio, you should have a head which would have a space equal to 70.8 cubic centimeters.

Remove the head from this engine, leaving the spark plugs in place. Turn the head upside down on a bench and level it with a spirit level. Then get a graduate from the drug store, mix up a solution of 50 per cent kerosene and 50 per cent light cylinder oil and pour it into the combustion chamber until you have used 70.8 cubic centimeters. This amount will not take up all the space in the combustion chamber. Then lay a straight edge across the combustion chamber and measure from the edge down to the level of the fluid. This will give you the amount of metal that can be planed off this head to give it a 6.2 to 1 compression ratio.

When reassembling the reconditioned head, it will be necessary to set ignition timing at 9 degrees before top center and it will also be necessary to use a gasoline having at least a 78 octane rating.



1942 Plymouth Wiring Diagram

A—Parking light, right  
 B—Headlight, right  
 C—Headlight, left  
 D—Parking light, left  
 E—Ignition distributor  
 F—Ignition coil  
 G—Horn relay  
 H—Horns  
 J—Generator  
 K—Starter motor  
 L—Battery  
 M—Terminal block  
 N—Signal light switch  
 P—Cable connector  
 Q—Headlight dimmer foot switch  
 R—Voltage regulator  
 S—Main lighting switch and fuse  
 T—Ammeter  
 U—Instrument light switch  
 V—Headlight bright beam indicator light  
 W—Instrument lights  
 X—Horn blowing ring or push button  
 Y—Fuel gage panel unit  
 Z—Ignition switch light

AA—Ignition switch and lock  
 BB—Automatic door switch  
 CC—Cable connector  
 DD—Dome light pillar switch  
 EE—Tail light, right  
 FF—Fuel gage tank unit  
 GG—License and signal light  
 HH—Dome light  
 JJ—Dome light pillar switch  
 KK—Cable connector  
 LL—Cable connector  
 MM—Tail light, left  
 1-6—Spark plug wires  
 7—Secondary cable  
 8—Primary cable  
 9—Ignition switch cable  
 10—Green  
 11—Green  
 12—Red  
 13—Green  
 14—Red  
 15—Starter cable and terminals  
 16—Battery ground cable  
 17—Red

18—Yellow  
 19—Black  
 20—Yellow  
 21—Red  
 22—Red  
 23—Yellow  
 24—Black  
 25—Black  
 26—Red  
 27—Red  
 28—Green  
 29—Black  
 30—Red  
 31—Brown  
 32—Brown  
 33—Black  
 34—Black  
 35—Blue  
 36—Brown  
 37—Red  
 38—Yellow  
 39—Black and yellow  
 40—Blue  
 41—Black  
 42—Red

In so far as the installation of two carburetors is concerned, this, of course, will mean that you will have to have made a special manifold, each one to feed four cylinders.

### CRANKCASE OIL BURNER

I have tried several methods of converting a stove to burn crankcase oil, and find that the biggest trouble is due to the feed line getting plugged up by the dirt in the oil.

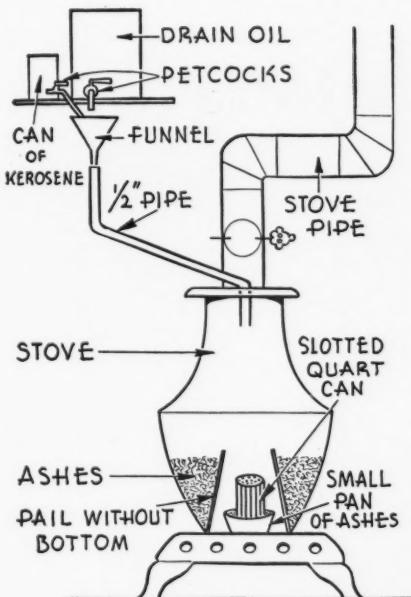
The best results are obtained by using a short piece of heavy chain hung from the top of the stove down to a pot in the center of the grate. Put a pipe through the top of the stove so that the oil will drip from the oil can down onto the chain. The oil will run down the chain and will burn in the pot and also on the chain. Give the stove a good draft, and this system will burn the oil in a satisfactory manner. *L. N. Webster, Moline, Ill.*

### ANOTHER METHOD

In the December issue of the *Clearing House*, you asked how to convert a regular stove so that it could burn the oil drained from crankcases.

I have been burning drain oil for years, and here is how I made the set-up:

Take an ordinary pail, cut the bottom out, and place it upside down on the grate. Bank the space between the outside of the pail and the inside



of the stove with ashes. Inside the pail I put a pan of ashes. On the ashes I put a quart can which has one end cut out and slots cut up the sides, with the bottom (which becomes the top when placed on the pan) punched full of holes.

On a shelf above the top of the stove, I put the can which holds the crankcase oil. A petcock and a short piece of pipe extend from the bottom of the can so that the oil can drip down into a funnel. The extension of the funnel opens into the stove, directly above the quart can. The oil drips down onto the quart can, through the holes and onto the ashes.

I run a few drops of kerosene down through the funnel to start the fire, and then keep it going with the oil. Keep the ash pit about three quarters full of ashes, and close the bottom draftdoor. *Chas. Baratta, Hawthorne, N. J.*

(We have not had a chance to test the above stoves. The letters are published as a matter of interest.)

#### OIL LEAK

*Some time ago we overhauled a 1932 Chrysler 6, putting in new piston rings, connecting rod bearings, and doing a pretty complete motor overhaul.*

*At the time, we did not drop the clutch to inspect the rear main bearing or rear cam shaft bearing plug.*

*The car seemed to use a lot of oil and a certain amount of it showed up in the clutch housing, as though it might be coming out through the rear main. The pan was dropped again and the clutch housing taken out and rear main bearing seals installed and camshaft plug checked.*

*This job has improved the oil consumption but the car still uses too much oil and we have no reason to believe that the oil is getting past the rings and being burned in the regular way that the engine might burn oil.*

*There is still an indication of a*

*small leak some place in the back end of the motor and we are at a loss to know how oil could possibly get out*

*Have you had any experience with this condition and will you please write us what your theory or experience indicates?—C. F. Kylling Co., Marysville, Calif.*

THE rear main bearing oil retainer, as you know, is supplied as an upper and lower half. In order to install the upper half, it is necessary to remove the flywheel. It may be that in this particular case you installed only the lower half, and the

upper half is needed to do a complete job.

However, there is another more likely cause of this trouble. Since you found it necessary to install new connecting rod bearings, the engine undoubtedly needs new main bearings also. If there was enough wear in the rod bearings to justify replacement, it is reasonable to expect the same amount of wear is present in the main bearings. I suggest, therefore, that you install new main bearings. Install a complete set if you can get authority. If not, at least install the rear, and a new oil seal.



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SECOND . . . Johnson provides you with complete, authentic application data. Original shaft sizes are listed, locations of various types of bearings, identification as to bearing size and material. Why not write for this complete set of folders covering all prominent makes of cars and trucks? They are FREE.



**JOHNSON BRONZE**  
*Sleeve BEARING HEADQUARTERS*  
455 S. MILL STREET • NEW CASTLE, PA.

# Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the Car Manufacturers and Supersede All Others Previously Published

PASSENGER CAR MAKE AND MODEL	Lowest Priced 4-Door Sedan (Delivered)	Wheelbase (In.)	Tire Size (In.)	ENGINE										CHASSIS										
				No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake Hp. at Specified R.P.M.	Compression Ratio (to-1)	Displacement Factor <sup>†</sup>	Cylinder Head Material	Crankshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch—Type and Make	Universal Joint Type and Make				
																		Type and Make						
																		Ratio (Std.)						
BUICK-Special	42-40A	1171	113	3.50/15	8-3½x4½	30.6	243.0	110-3400	6.00	34.5	CI	LB	CI	AC	AC	S-C	Hay	DR	DR	Obl	Mp-SS	½ Own	4.10	IC
BUICK-Ex. Spec.	42-40B	1213	121	6.50/16	8-3½x4½	30.6	248.0	110-3400	6.00	36.1	CI	LB	CI	AC	AC	S-C	Hay	DR	DR	Obl	Mp-SS	½ Own	4.40	IC
BUICK-Super	42-50	1391	124	6.50/16	8-3½x4½	30.6	248.0	118-3600	6.30	35.0	CI	LB	CI	AC	A-H	S-C	Hay	DR	DR	Obl	Mp-SS	½ Own	4.40	IC
BUICK-Century	42-80	1465	126	7.00/15	8-3½x4½	37.8	320.2	165-3800	6.70	38.6	CI	LB	AI	AC	A-H	S-C	Hay	DR	DR	Obl	Mp-S	½ Own	3.90	IC
BUICK-Roadmaster	42-70	1601	129	7.00/15	8-3½x4½	37.8	320.2	165-3900	6.70	39.8	CI	LB	AI	AC	A-H	S-C	Hay	DR	DR	Obl	Mp-S	½ Own	4.10	IC
BUICK-Limited	42-90	2418	139	7.50/16	8-3½x4½	37.8	320.2	165-3800	6.70	36.3	CI	LB	AI	AC	A-H	S-C	Hay	DR	DR	Obl	Mp-S	½ Own	4.55	IC
CADILLAC . . . 61, 62, 63, 60S	1647	(a)	7.00/15	8-3½x4½	39.2	346.0	150-3400	7.25	39.9	CI	LB	AI	None	AC	S-C	Wal	DR	DR	Long	Nb-Mec	½ Own	3.77	IC	
CADILLAC . . . 67, 75	2896	139-136	7.50/16	8-3½x4½	39.2	346.0	150-3400	7.25	37.0	CI	LB	AI	None	AC	S-C	Wal	DR	DR	Long	Nb-Mec	½ Own	4.27	IC	
CHEVROLET . . . .	116	6.00/16	6-3½x3¾	29.4	216.5	90-3300	6.50	35.4	CI	Var	CI	None	AC	Car	Var	DR	DR	Inl	M-Own	½ Own	4.11	IC		
CHRYSLER-Roy. & Win. C-34	1177	121½	6.25/16	6-3½x4½	28.3	250.6	120-3800	6.60	34.9	CI	Mor	CI	Pur	AC	Car	.....	AL	Wil	B&B	.....	½ Own	3.91	IC	
CHRYSLER-Sar. & N.Y. C-36	11405	127½	7.00/15	8-3½x4½	33.8	323.5	140-3600	6.80	40.6	CI	Whit	AI	Pur	AC	Str	.....	AL	AL	B&B	.....	½ Own	3.91	IC	
CHRYSLER-Cr. Imp. C-37	145½	7.50/15	8-3½x4½	33.8	323.5	140-3600	6.80	.....	CI	Whit	AI	Pur	AC	Str	.....	AL	AL	B&B	.....	½ Own	3.58	IC		
CROSLEY . . . .	42	80	4.25/12	2-3x2½	7.2	35.3	12-4000	5.60	.....	CI	.....	CI	None	AC	Til	Own	AL	Rock	Mp-S	½ Spi	5.14	C		
DE SOTO-DeL. & Cus. S-10	1103	121½	5.25/16	8-3½x4½	28.3	236.6	115-3800	6.60	34.5	CI	Mor	CI	Pur	.....	Car	.....	AL	Wil	B&B	Rb-	½ Own	3.91	IC	
DODGE-DeL. & Cus. D-22	998	119½	6.00/16	6-3½x4½	25.3	230.2	105-3600	6.70	36.8	CI	Mor	AI	Pur	.....	Str	.....	AL	B&B	Bt-	½ Own	4.10	IC		
FORD . . . .	Six 850	114	6.00/16	6-3.30x4.40	26.1	226.0	90-3300	6.70	34.8	CI	Dia	CS	.....	Own	.....	.....	.....	.....	.....	Long	Nb-Spi	¾ Own	3.78	Tr
FORD . . . .	V-8 860	114	6.00/16	8-3.06x3.75	30.0	221.0	90-3800	6.20	33.9	CI	Dia	CS	.....	Own	.....	.....	.....	.....	.....	Long	Nb-Spi	¾ Own	3.78	Tr
HUDSON-6 & 6 DeL.	20	116	(d)	6-3x4½	21.6	175.0	92-4000	7.25	34.4	CI	Dia	.....	None	AC	Car	Old	AL	Nat	Own	Nb-Spi	½ Own	4.55	IC	
HUDSON-Sup. & Com. 6.21-22	121	6-3x5	21.6	212.0	102-4000	6.50	35.1	CI	.....	None	AC	Car	Old	AL	Nat	.....	AL	.....	.....	Nb-Spi	½ Own	4.11	IC	
HUDSON-Comm. 8 . . . 24-25	121	(f)	8-3x4½	28.8	254.0	128-4200	6.50	39.4	CI	Dia	.....	None	AC	Car	Old	AL	Nat	Own	Nb-Spi	½ Own	4.11	IC		
HUDSON-Com. Cus. 8 . . . 27	128	6.50/15	8-3x4½	28.8	254.0	128-4200	6.50	37.8	CI	Dia	.....	None	AC	Car	Old	AL	Nat	.....	Nb-Spi	½ Own	4.55	IC		
LINCOLN-Zeph. & Cont.	1700	125	7.00/15	12-2.93x3.75	41.4	305.0	130-3800	7.00	40.7	CI	.....	CS	.....	Own	Own	Own	Own	Long	Nb-Spi	¾ Own	4.44	Tr		
LINCOLN-Custom . . . .	12950	138	7.00/15	12-2.93x3.75	41.4	305.0	130-3800	7.00	37.3	CI	.....	CS	.....	Own	Own	Own	Own	Long	Nb-Spi	¾ Own	4.44	Tr		
MERCURY . . . .	1065	118	6.50/15	8-3.18x3.75	32.5	239.0	100-3600	6.40	31.7	CI	.....	CS	.....	Own	Own	Own	Own	Long	Sb-Spi	¾ Own	3.54	Tr		
NASH-Amb. 600 . . . .	4240	968	112	5.50/16	6-3½x3¾	23.4	172.6	75-3600	6.87	33.4	CI	W-D	AI	.....	AC	Car	Old	Nat	Own	Nb-Spi	½ Own	4.55	IC	
NASH-Amb. Six . . . .	4260	1134	121	6.25/16	6-3½x4½	27.3	234.8	105-3400	6.50	35.9	CI	W-D	AI	AC	AC	Car	.....	AL	.....	B&B	.....	½ Own	4.11	IC
NASH-Amb. 8 . . . .	4280	1184	121	6.50/16	8-3½x4½	31.2	260.8	115-3400	6.60	37.9	CI	W-D	AI	.....	AC	Car	Old	AL	.....	B&B	M-Mec	½ Own	4.11	IC
OLDSMOBILE . . . .	Special 6	1088	119	6.00/16	6-3½x4½	29.4	238.1	100-3400	6.50	37.0	CI	Whit	AS	None	AC	Car	Var	DR	DR	B&B	M-Mec	½ Own	4.11	IC
OLDSMOBILE . . . .	Dynamic 6	1153	125	6.50/15	6-3½x4½	29.4	238.1	100-3400	5.50	36.4	CI	Whit	AS	None	AC	Car	Var	DR	DR	B&B	M-Mec	½ Own	4.30	IC
OLDSMOBILE . . . .	Special 8	1130	119	6.50/15	8-3½x4½	33.8	257.1	110-3600	6.50	35.7	CI	LB	AS	None	AC	Car	Var	DR	DR	B&B	M-Mec	½ Own	3.90	IC
OLDSMOBILE . . . .	Dynamic 8	1196	125	6.50/16	8-3½x4½	33.8	257.1	110-3600	6.50	38.1	CI	LB	AS	None	AC	Car	Var	DR	DR	B&B	M-Mec	½ Own	4.30	IC
OLDSMOBILE . . . .	Custom 8	1376	127	7.00/15	8-3½x4½	33.8	257.1	110-3600	6.50	.....	CI	LB	AS	None	AC	Car	Var	DR	DR	B&B	M-Mec	½ Own	4.30	IC
PACKARD-6 . . . .	2000-10-20	1286	120-122	6.50/15	6-3½x4½	29.4	245.0	105-3600	6.71	37.7	CI	M-R	AI	.....	AC	Car	.....	AL	A-W	Long	Rb-UP	½ Own	4.30	IC
PACKARD-B . . . .	2001-11-21	1341	120-127	(b)	8-3½x4½	33.8	282.0	125-3600	6.85	40.1	CI	M-R	AI	.....	AC	Car	.....	AL	A-W	Long	Rb-Mec	½ Own	(g)	IC
PACKARD-Sup. 8 . . . .	2003-24-45	1739	127-38-48	(c)	8-3½x4½	33.8	356.0	165-3600	6.85	43.7	CI	Mor	AI	.....	AC	Car	.....	AL	AL	Long	Rb-Mec	½ Own	(h)	IC
PACK'D-Cus. Sup. 8 . . . .	2006-7-8	2271	127-38-48	(d)	8-3½x4½	33.8	356.0	165-3600	6.85	43.5	CI	Mor	AI	.....	AC	Car	.....	AL	AL	Long	Rb-Mec	½ Own	(h)	IC
PLYMOUTH . . . .	P-14	889	117	6.00/16	6-3½x4½	25.3	217.8	95-3400	6.80	34.7	CI	Mor	CI	Pur	.....	Car	.....	AL	B&B	Bt-	½ Own	3.90	IC	
PONTIAC-Torpedo 8 . . . .	1062	119	6.00/16	6-3½x4	30.4	239.2	90-3200	6.50	37.2	CI	Mor	CN	None	AC	Car	Var	DR	DR	Inl	Rb-SM	½ Own	4.10	IC	
PONTIAC-Stream. 6 . . . .	1118	122	6.50/16	6-3½x4	30.4	239.2	90-3200	6.50	37.0	CI	Mor	CN	None	AC	Car	Var	DR	DR	Inl	Rb-SM	½ Own	4.30	IC	
PONTIAC-Torpedo 8 . . . .	1088	119	6.00/16	8-3½x4½	33.8	243.9	103-3500	6.50	38.2	CI	Mor	CN	None	AC	Car	Var	DR	DR	Inl	Rb-SM	½ Own	4.10	IC	
PONTIAC-Stream. 8 . . . .	1144	122	6.50/16	8-3½x4½	33.8	248.9	103-3500	6.50	37.9	CI	Mor	CN	None	AC	Car	Var	DR	DR	Inl	Rb-SM	½ Own	4.30	IC	
STUDEBAKER-Champ. 6 . . . 4G	870	55.0/16	6-3x4	21.6	169.6	80-4000	6.50	34.3	CI	Dia	CI	None	AC	Car	Wal	AL	Wil	B&B	M-Spi	½ Spi	4.10	IT		
STUDEBAKER-Com. 8 . . . 12A	1128	6.25/16	6-3½x4½	26.3	226.2	94-3600	6.50	35.7	CI	Dia	CI	Fram	AC	Str	Wal	AL	Wil	B&B	M-Spi	½ Spi	4.09	IT		
STUDEBAKER-Pres. 8 . . . 8C	1262	7.00/15	8-3½x4½	30.0	250.4	117-4000	6.50	35.1	CI	Dia	CI	Fram	AC	Str	Wal	AL	Wil	Inl	M-Spi	½ Spi	4.09	IT		
WILLYS-American	42	811	104	5.50/16	4-3½x4½	15.6	134.2	63-3900	6.48	32.1	CI	LB	CI	None	AC	Car	Mc	AL	AL	B&B	M-UP	½ Own	4.44	½ E

**ABBREVIATIONS:**

(e)—6.00/16

# Tune-Up Specifications

These Specifications Are Brought Up-to-Date Each Month by the Car Manufacturers and Supersede All Others Previously Published

PASSENGER CAR MAKE AND MODEL	PISTON RINGS		VALVES						IGNITION						FRONT AXLE								
	Compression Pressure at Cranking Speed (Lb.)		No. and Width Compression	No. and Width Oil	Inlet—Seat Angle (Deg.)		Operating Tappet Clearance	Inlet Tappet Clearance for Valve Timing	Timing		Spark Plug	Timing	Caster (Deg.)	Camber (Deg.)	Toe-in (In.)	King Pin Inclination (Deg.)							
	Inlet	Exhaust			Inlet	Exhaust			Inlet Valve Opens—Before or After T.C.	Exhaust Closes—Before or After T.C.													
Buick-Special.....42-40A	112	2-1/2	2-1/2	45 45	.371	.015H	.015H	.138	22A	AC-46	.025	.015	31	4B	Fly	A	N-8 to +1 1/2	0-1/8	3 1/2 to 4 1/2				
Buick-Ex. Spec.....42-40B	112	2-1/2	2-1/2	45 45	.371	.015H	.015H	.138	22A	AC-46	.025	.015	31	4B	Fly	A	N-8 to +1 1/2	0-1/8	3 1/2 to 4 1/2				
Buick-Super.....42-50	115	2-1/2	2-1/2	45 45	.371	.015H	.015H	.138	22A	AC-46	.025	.015	31	6B	Fly	A	N-8 to +1 1/2	0-1/8	3 1/2 to 4 1/2				
Buick-Century.....42-60	115	2-1/2	2-1/2	45 45	.371	.015H	.015H	.148	25A	AC-46	.025	.015	31	6B	Fly	A	N-8 to +1 1/2	0-1/8	3 1/2 to 4 1/2				
Buick-Roadmaster.....42-70	115	2-1/2	2-1/2	45 45	.371	.015H	.015H	.148	25A	AC-46	.025	.015	31	6B	Fly	A	N-8 to +1 1/2	0-1/8	3 1/2 to 4 1/2				
Buick-Limited.....42-90	115	2-1/2	2-1/2	45 45	.371	.015H	.015H	.148	25A	AC-46	.025	.015	31	6B	Fly	A	N-8 to +1 1/2	0-1/8	3 1/2 to 4 1/2				
Cadillac.....61, 62, 63, 60S	182X	2-(a)	2-5/8	45 45	.341	AA	AA	AA	TC	10A	AC-104	.030	.015	31	5B	TD	A	7	25	N1 1/4 to N2 3/4	5° 51'		
Cadillac.....67, 75	182X	2-(a)	2-5/8	45 45	.341	AA	AA	AA	TC	10A	AC-104	.030	.015	31	5B	TD	A	7	25	N1 1/4 to N2 3/4	5° 51'		
Chevrolet.....	2-1/8	1-1/8	30	341	.006H	.013H	.006	.3B	5A	AC-104	.040	.018	39	5B	Fly	A	5 1/2	15	0 to +1/2	0-1/8	4 1/2		
Chrysler-Roy. & Win. C-34	125	2-3/2	2-3/2	45 45	.340	.008H	.010H	.014	12B	5A	AL-A7	.025	.020	34-38	2A	VD	A	5	18	N1 to +1	0 to +3/4	4 1/2 to 6	
Chrysler-Sar. & N.Y. C-36	125	2-3/2	2-3/2	45 45	.340	.008H	.010H	.011	6B	12A	AL-A7	.025	.018	27-30	2A	VD	A	6	26	N1 to +1	0 to +3/4	4 1/2 to 6	
Chrysler-Cr. Imp. C-37	125	2-3/2	2-3/2	45 45	.340	.008H	.010H	.011	6B	12A	AL-A7	.025	.018	27-30	2A	VD	A	6	26	N1 to +1	0 to +3/4	4 1/2 to 6	
Crosley.....	80	2-1/8	1-5/8	45 45	.311	.007C	.009C	...	20B	...	AL-A5	.025	.020	46	TC	Fly	A	3	...	6 1/2 to 11	2	1/8	6 1/2
De Soto-DeL. & Cus. S-10	125	2-3/2	2-3/2	45 45	.340	.008H	.010H	.014	12B	6A	AL-A7	.025	.020	34-38	4A	VD	A	5	18	N1 to +1	0 to +3/4	0-1/8	4 1/2 to 6
Dodge-DeL. & Cus. D-22	125	2-3/2	2-3/2	45 45	.340	.008H	.010H	.014	12B	6A	AL-A7	.025	.020	34-38	2A	VD	A	5	15	N1 to +1	0 to +3/4	0-1/8	4 1/2 to 6
Ford.....Six	140Y	2-(c)	1-(d)	45 45	.311	.012C	.015C	...	TC	6A	Ch-H-10	.032	.015	...	4B	DH	...	8	1	...	1/8	8	
Ford.....V-8	140Y	2-(c)	1-(d)	45 45	.311	.012C	.015C	...	TC	6A	Ch-H-10	.025	.015	...	4B	DH	...	22	8	1	1/8	8	
Hudson-6 & Super 6.....20	125	2-3/2	2-3/2	45 45	.341	.010H	.012H	...	27 1/2B	32 1/2A	Ch-J-9	.038	.020	34	1 1/2B	Fly	A	6	13	0-1/4	1/2 to 1/4	3 1/2 to 36'	
Hudson-Sup. & Com. 6.21-22	120	2-3/2	2-3/2	45 45	.341	.006H	.008H	...	10 1/2B	18 1/2A	Ch-J-9	.038	.020	34	1 1/2B	Fly	A	6	13	0-1/4	1/2 to 1/4	3 1/2 to 36'	
Hudson-Comm. 8.....24-25	119	2-3/2	2-3/2	45 45	.341	.006H	.008H	...	10 1/2B	18 1/2A	Ch-J-9	.038	.017	30 1/2	TC	Fly	A	9	18	0-1/4	1/2 to 1/4	3 1/2 to 36'	
Hudson-Com. Cus. 8.....27	119	2-3/2	2-3/2	45 45	.341	.006H	.008H	...	Ch-J-9	.038	.017	30 1/2	TC	Fly	A	9	18	0-1/4	1/2 to 1/4	3 1/2 to 36'			
Lincoln-Zeph. & Cont.....	2-3/2	1-3/8	45 45	.311	.013C	.013C	...	10 1/2B	Ch-H-10	.029	.015	...	4B	DH	A	5	27	3 to 5	1/4 to 3/4	1/8	3 3/4-4 1/4		
Lincoln-Custom.....	2-3/2	1-3/8	45 45	.311	.013C	.013C	...	10 1/2B	Ch-H-10	.029	.015	...	4B	DH	A	5	27	3 to 5	1/4 to 3/4	1/8	3 3/4-4 1/4		
Mercury.....100	2-3/2	1-3/8	45 45	.311	.011C	.011C	...	TC	...	Ch-H-10	.025	.015	...	4B	DH	A	5	22	3 to 5	1/4 to 3/4	1/8	8	
Nash-Amb. 600.....4240	120	2-3/2	1-7/8	45 45	.341	.015	.015	...	19B	23A	AL-AN7	.025	.020	...	TC	VD	A	5	14	0 to 1/2	0 to 3/4	0 to 1/8	5 1/2
Nash-Amb. Six.....4260	125	2-3/2	2-3/2	45 45	.372	.015	.015	...	14B	31A	AC-45	.025	.020	38	4B	VD	A	6	17	0 to 1/2	1/4 to 3/4	1/8 to 1/8	4 1/2
Nash-Amb. 8.....4280	110	2-1/8	2-(e)	45 45	.372	.015	.015	...	14B	31A	AC-45	.025	.020	27	7B	VD	A	7	16	0 to N1 1/2	1/4 to 3/4	1/8 to 1/8	4 1/2
Oldsmobile.....Special 6	115	2-3/2	2-3/2	30 45	.342	.008	.011	...	5A	AC-44	.040	.020	35	TC	Fly	A	5	18 1/2	0 to N3 1/4	N-8 to +3/4	1/8 to 1/8	4 0 to 5 1/2	
Oldsmobile.....Dynamite	115	2-3/2	2-3/2	30 45	.342	.008	.011	...	5A	AC-44	.040	.020	35	TC	Fly	A	5	18 1/2	0 to N3 1/4	N-8 to +3/4	1/8 to 1/8	4 0 to 5 1/2	
Oldsmobile.....Special 8	107	2-3/2	2-3/2	30 45	.342	.008	.011	...	TC	10A	AC-44	.030	.015	31	2B	Fly	A	6	20 1/2	0 to N3 1/4	N-8 to +3/4	1/8 to 1/8	4 0 to 5 1/2
Oldsmobile.....Dynamic 8	107	2-3/2	2-3/2	30 45	.342	.008	.011	...	TC	10A	AC-44	.030	.015	31	2B	Fly	A	6	19 1/2	0 to N3 1/4	N-8 to +3/4	1/8 to 1/8	4 0 to 5 1/2
Oldsmobile.....Custom 8	107	2-3/2	2-3/2	30 45	.342	.008	.011	...	TC	10A	AC-44	.030	.015	31	2B	Fly	A	6	20 1/2	0 to N3 1/4	N-8 to +3/4	1/8 to 1/8	4 0 to 5 1/2
Packard-6.....2000-10-20	2-(f)	2-3/2	30 45	.339	.007H	.010H	...	1B	5A	(g)	.028	.020	38	4B	VD	A	5	14	N1 1/2	1/4 to 1/2	0-1/8	5 35'	
Packard-8.....2001-11-21	2-(f)	2-3/2	30 45	.339	.007H	.010H	...	1B	5A	(g)	.028	.015	27	5B	VD	A	5 1/2	17	N1 1/2	1/4 to 1/2	0-1/8	5 35'	
Packard-Sup. 2003-23-4-5	2-(f)	2-3/2	30 45	.340	AA	AA	...	4B	10A	(g)	.028	.015	27	4B	VD	A	7	20	N2 1/2	1/4 to 1/2	0-1/8	5 35'	
Packard-Sup. 2006-7-8	2-(f)	2-3/2	30 45	.340	AA	AA	...	4B	10A	(g)	.028	.015	27	4B	VD	A	7	20	N2 1/2	1/4 to 1/2	0-1/8	5 35'	
Plymouth.....P-14	125	2-3/2	2-3/2	45 45	.340	.008H	.010H	...	12B	6A	AL-A7	.025	.020	34-38	3B	VD	A	5	15	N1 to +1	0 to +3/4	0 to 1/8	4 1/2-6
Pontiac-Torpedo 6.....42-25	160X	2-3/2	1-3/8	30 45	.312	.012H	.012H	...	5A	AC-45	.025	.020	37	4B	Fly	A	6	18	1/2 to N1	0 to 1	0 to 1/8	5	
Pontiac-Stream. 6.....42-26	160X	2-3/2	1-3/8	30 45	.312	.012H	.012H	...	5A	AC-45	.025	.020	37	4B	Fly	A	6	18	1/2 to N1	0 to 1	0 to 1/8	5	
Pontiac-Torpedo 8.....42-27	158X	2-3/2	1-3/8	30 45	.312	.012H	.012H	...	5A	AC-45	.025	.015	31	4B	Fly	A	6	19 1/2	1/2 to N1	0	0 to 1/8	5	
Pontiac-Stream. 8.....42-28	158X	2-3/2	1-3/8	30 45	.312	.012H	.012H	...	5A	AC-45	.025	.015	31	4B	Fly	A	6	19 1/2	1/2 to N1	0	0 to 1/8	5	
Studebaker-Champ.....4G	105	2-(a)	1-3/8	45 45	.312	.016C	.016C	...	15B	10A	Ch-J-9	.020	.020	35	2B	Fly	A	5	10 1/2	1 to 2	1/2	1/8 to 1/8	5 1/2
Studebaker-Champ.....12A	105	2-3/2	1-3/8	45 45	.343	.016C	.016C	...	15B	10A	Ch-J-9	.025	.020	35	2B	VD	A	6	13	N1 1/2 to N3 1/4	1/2	1/8 to 1/8	5 1/2
Studebaker-Champ.....8C	105	2-3/2	1-3/8	45 45	.343	.016C	.016C	...	15B	10A	Ch-J-9	.025	.020	34	TC	VD	A	8	15	N1 1/2 to N3 1/4	1/2	1/8 to 1/8	5 1/2
Willys-American.....42	111	2-3/2	1-3/8	45 45	.373	.014C	.014C	...	9B	12A	Ch-J-9	.030	.020	41	TC	Fly	A	4	11 1/4	3	2	3 1/2-5 1/2	7 1/2

**ABBREVIATIONS:**

(e)—1-1/8; 1-1/8  
(f)—1-1/8; 1-1/24  
(g)—AC-104 or Champion Y-4A  
x—At 1000 rpm  
y—At 2400 rpm

A—Above  
AA—Automatic Adjustment  
AC—AC Spark Plug Division  
A—After Top Center  
B—Before Top Center

C—Cold  
Ch—Champion Spark Plug Co.  
DH—Distributor Housing  
Fly—Flywheel  
H—Hot

N—Negative  
TC—Top Center  
TD—Timing Disc  
VD—Vibration Damper

## **Motor Car Price, Weight and Body Table**

**Following are delivered prices at factory, as of Oct. 1, 1941, for cars with standard equipment and include all federal taxes with exception of Chrysler, Crosley, De Soto, Dodge, Ford, Lincoln, Mercury and Plymouth. Optional equipment, state or local taxes, transportation charges and finance charges are extra.**

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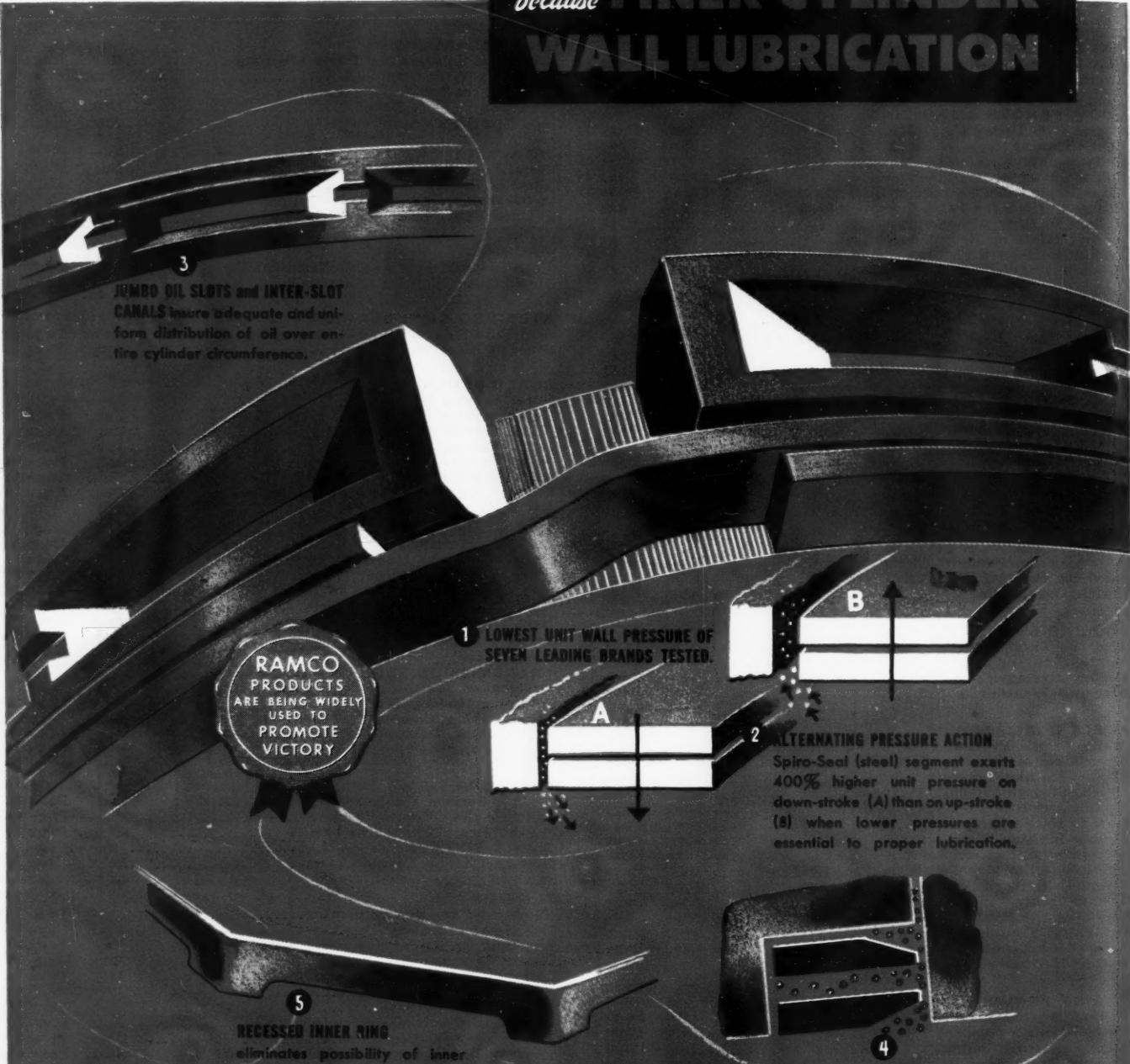
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Longer OIL CONTROL  
because FINER CYLINDER  
WALL LUBRICATION



For 21 years the cardinal principle of Ramco engineering has been to control oil without starving the cylinder wall of essential lubrication. Here you see some of the developments resulting from this engineering effort. It is Wear-Reducing factors like these which make possible Ramco's 10,000 Mile Ring and Labor Guarantee . . . the guarantee tens of thousands are using to increase ring jobs and used car sales.

See Your Ramco Jobber or Write Ramsey Accessories  
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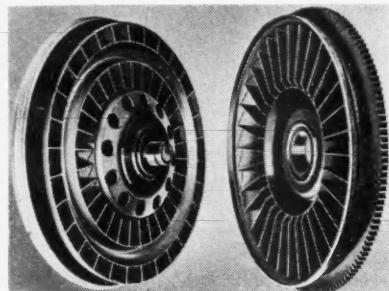
RE-POWER with  
**RAMCO 10 up**  
IT BRIDGES THE GAP!  
PISTON RINGS AND PISTON EXPANDERS

# SERVICE HINTS FROM THE FACTORIES

## Trouble-Shooting

An occasional complaint of a noise in the vicinity of the fluid-drive unit of the 1941 or 1942 Dodge may be located and corrected by the following procedure:

Grinding or whining noise (noticeable with the engine running while the car is standing still and while the clutch pedal is depressed three or four seconds): Caused by defective



runner hub inner roller bearing. Replace the bearing, lubricate with wheel bearing grease. Install the bearing with the end which bears the trademark toward the rear of the fluid drive unit.

Squealing noise (noticeable immediately when the clutch pedal is depressed with the engine running and the car standing still): Caused by defective clutch-release bearing. Necessary to replace bearing.

Roughness (noticeable with car standing still, or when accelerating): Caused by defective runner hub outer ball bearing. Replace complete fluid-drive unit.

Whining noise (constant): Caused by fluid being low in fluid-drive unit. Necessary to add fluid to bring it up to proper level.

## Piston Change

Early 1942 models of the Oldsmobile Six engine were fitted with cast-iron pistons. Beginning with engine No. G-441345, the pistons were changed to Armasteel, the same type of material used for the 8-cylinder engine.

The Armasteel pistons can be distinguished from the cast iron pistons by the fact that the cast iron piston had a groove around the skirt of the piston at the piston pin hole, and the Armasteel piston does not have this groove.

The Armasteel pistons may be installed in engines originally fitted with cast iron pistons only if a complete set is installed. The difference in weight between the cast iron and the Armasteel pistons will result in an extremely rough engine if less than a complete set is installed.

## Poor Idle

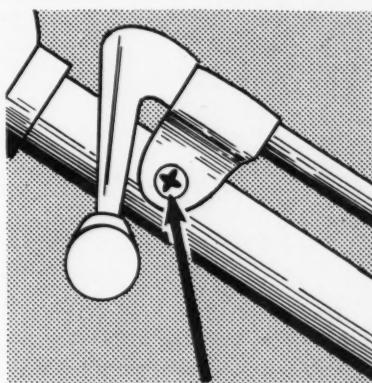
If complaints of poor idle are encountered with the 1941 Pontiac Six, the condition may be due to an air leak in the gasket between the carburetor body and the flange. Installation of a new gasket will correct this trouble.

## HEAD GASKETS

There are two types of cylinder-head gaskets used in the 1942 Buick engine. A crimped steel gasket for high compression on the compound carburetor equipped engines, and a steelbestos gasket for low compression on single carburetor installations. Steel gaskets are coated with a lacquer when made and are not to be coated with any type of gasket oil or sealer in service.

## Gear Shift Bracket

If the screws loosen in the gear shift upper control bracket on Pontiac cars, the bracket will wobble and prevent smooth shifting. It is recommended that every car which comes



into the shop be inspected to determine if this bracket is loose.

To tighten, push the shift lever alternately away from and toward the steering wheel, tightening the screws at the same time.

RE-POWER  
with

R

A

M

C

O

19

up

IT BRIDGES THE GAP!

## WOMEN BUYERS

(Continued from Page 33)

its appearance. She must, and does, often trust her butcher's judgment as to the best cut for her particular purpose. She also turns to him for advice on what to buy.

In her opinion, the buying of automotive service comes in this same category. Here, too, she must rely entirely on someone else's judgment. And, just as she turns to her butcher for advice, she wants to turn to her service station man.

But how can she recognize a "dependable" repair shop? Or, to look at it from your side, how can you show these women your sincerity and readiness to serve them?

Well, one of the few measuring sticks with which the woman driver can evaluate a service shop is the garage man's acquaintance with consumer literature. For example, suppose she reads in *Colliers* of the extensive check-up necessary to prepare a car for spring and summer driving and as a result takes her car in for a thorough "change over." She probably tells the mechanic to "do

whatever is necessary" instead of listing all the things she has read, taking it for granted that he knows them better than she. Now, if a month later she has trouble with the cooling system, she will undoubtedly—and justifiably—ask why that wasn't attended to when she was in before. She is told that, because she hadn't specifically said to flush and check the cooling system, they simply drained out the anti-freeze! You don't blame her, do you, if she puts such a service station in the same class with the butcher who sold her the bad hamburger?

If a government bulletin tells her that 20 per cent of all tire wear is due to under-inflation, and her serviceman advises against the pressure recommended in her instruction manual (he says it makes the car ride "hard") whom do you think she'll believe?

You know how disgusted you become with sales girls in department stores who aren't familiar with the merchandise in their departments. Well, that's just how we women feel about a serviceman who isn't familiar with every phase of service.

Once a woman finds a merchant she feels she can trust, she will turn to him for advice on all matters which appear to her to be controversial. For instance, is there such a thing as a 2000-mile oil, as she saw in an advertisement, or should she change oil every 1000 miles, as her woman's magazine advised?

Her opinions in all matters automotive will be largely influenced by you. In these war days, you will save yourself many future headaches if you remind her that many of the materials we are prone to consider today as "substitutes" are not really inferior "substitutes" at all, but excellent alternatives.

Most of the alternatives to which we are being forced will serve well. Many of them will excell the replaced material.

Every woman driver you can develop into a regular customer of your shop is a sound investment in your business future. *MOTOR AGE* has pioneered in this subject of automotive merchandising for women and today more than ever before it is vitally important.

### Henry B. Manton

Following a three months' illness, Henry B. Manton, one of the founders and a director of The Goodyear Tire & Rubber Co., died at his home in Akron, Dec. 19. He was 74.

Manton, who was president of the Robinson Clay Products Co., of Akron, had started with his company in 1887, becoming its treasurer in 1902 and succeeding to its presidency in 1909.

Surviving are two daughters, Mrs. J. Penfield Seiberling, and R. S. Saalfeld and six grandchildren.

ARO →  
LUBRICATING EQUIPMENT

1930  
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1935  
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LEADERSHIP

Year after  
year makes  
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for you!

CHASSIS

Again—in 1942—ARO offers lubricating equipment of outstanding Beauty, Quality and Performance. ARO does a better job... does it quicker... and at less cost per job. That's money in your pocket. We challenge comparison. Ask any ARO Jobber.

THE ARO EQUIPMENT CORPORATION, BRYAN, OHIO, U.S.A.



## "My two sons and I are glad we have Studebaker"

"I HAVE been in the retail automobile business for the past thirty-two years," writes Charles Newding, Studebaker dealer in Galveston, Texas.

"During that time I have sold several makes of cars, but my profitable experience in handling Studebaker since 1935 makes me proud to represent this fine product in my community.

"Studebaker's factory cooperation is the finest I have ever experienced. Its selling plans are packed with hard common sense and the cars themselves are consistent leaders in value. That's why I believe Studebaker offers me or any dealer better profit possibilities.

"My two sons are in business with me and we are all looking forward to the future with great confidence."

Men like Studebaker Dealer Newding, with wide experience in the automobile field, are generally most appreciative of their association with "America's Friendliest Factory." They have learned that Studebaker's sincere and intelligent effort, to give its cooperative programs ever-increasing effectiveness, means a lot in assuring them profitable retail operation, year after year. You may rest assured that Studebaker's long experience and close study will create new and profitable programs for Studebaker dealers when the post-emergency period arrives.

# STUDEBAKER

THE GREAT INDEPENDENT

**FOR AMERICA'S DEFENSE**  
Studebaker is building an unlimited quantity of airplane engines, military trucks and other material.

**FOR AMERICA'S TRANSPORTATION**  
Studebaker is building a limited number of passenger cars.

# SHOP KINKS

\$ 3



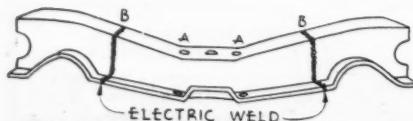
Here's your chance to pick up a little cigaret money. We'll pay three bucks (\$3.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and quicker than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Here are some that were accepted this month:

## REPLACING REAR CROSS MEMBER

We have had some jobs in which the rear cross member of the frame of a Ford passenger car or pickup truck has broken. These cases have been traced to extremely hard service on rough roads, but, nevertheless, they have to be repaired. The break usually occurs at the spring seat of the cross member.

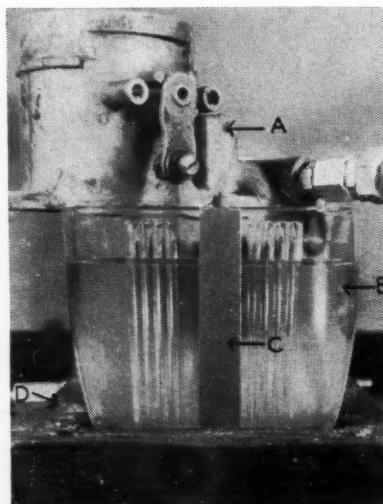
To save the time of removing the bed of the truck or the body of the passenger car, which would be necessary in order to cut the rivets holding the old cross member, and then riveting or bolting in the new one, we have developed the following procedure: We measure from the bolt hole "A" on each side of the center for a distance of 7 in., and make corresponding measurements on the new cross member. Then we cut out this section of the old cross member, using a cutting torch, and also cut out the same size section of the new cross member. Then we place the new section in position between the ends of the old one, and electric weld it in place.

We find this saves considerable time, and we have never had a cross member fail after installing it in this manner. *Henry E. Earl, The Superior Oil Co., Box 208, Welsh, La.*



## TESTS FLOAT VALVE

Here is a device I made for testing the carburetor float needle valve and seat. It can be used on all makes of carburetors which have the float mounted in the upper or air horn casting.



The glass bowl is one I bought at the five-and-ten, and the steel scale "C" is sharpened on one end and driven into the wood base "D" to keep it permanently in position.

The bowl cover and air horn assembly, with a new float, needle valve and seat, is mounted on the glass bowl. A fuel pump is connected and gasoline pumped in through the needle valve, just as in actual operation. The float will rise and close the needle valve

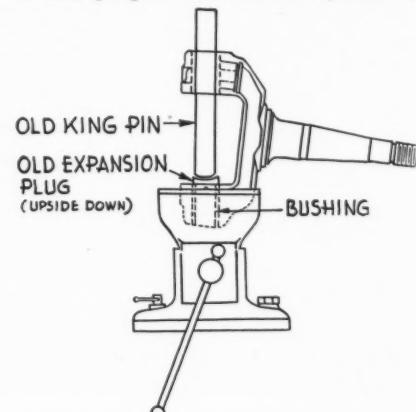
when the gas level in the bowl is high enough.

At this point, I make a note of the fuel level as shown by the steel scale, and, leaving the pump connected and operating, I continue with the overhauling job on the rest of the carburetor. If the needle valve is seating properly, it will prevent the fuel pump from pumping any more gas into the bowl.

When the rest of the carburetor has been overhauled, I check the fuel level again, and, if it is the same as the original reading, I know that the needle valve is seating properly.—*Milt Pullen, 18829 Reed Ave., Melvindale, Mich.*

## REMOVING KING PIN BUSHINGS

When you have no bushing driver of the proper size available, here is



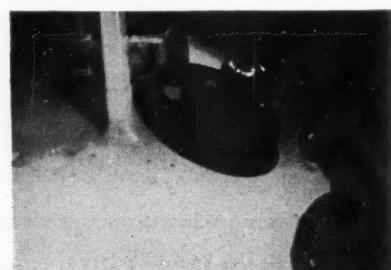
an easy way to remove king pin bushings:

Drive out the old king pin and the expansion plug. Then turn the expansion plug upside down and place it on the bushing. Using the old king pin as a driver, drive the plug down against the bushing. The plug will cup slightly so that it will not scratch the inside of the knuckle, but it will drive the bushing out easily. *Morris Kandell, Slim's Service, 5th and Tioga Streets, Philadelphia, Pa.*

## TROUBLE LIGHT

Here is a trouble light we have found to be very useful for places in which a strong light is desired

It is a regular drop cord with a white reflector, and uses a No. 1 Photoflood light which we buy for 15 cents each.—*Leo M. Nask, 5009 Fredro, Detroit, Mich.*



# Honest Work

## Deserves Applause



THE PERFECT CIRCLE COMPANIES

HAGERSTOWN, INDIANA, U. S. A. AND TORONTO, ONTARIO, CANADA

PERFECT  
CIRCLE

PISTON RINGS



## MAGNETO TEST

(Continued from Page 35)

take a more important place in our business.

Repairing magnetos is too big a subject to take up in one article. There are too many kinds, makes and models, and each kind requires different tests, methods, and tools. It won't hurt any mechanic who wants to be familiar with the different kinds of magnetos to read over a book on the subject or study up on the service manuals around the shop. All I

can hope to do here is to go over the equipment needed for magneto service.

First there's a new type of tester some shops have bought in recent months. It beats the old way of clamping a magneto in a vise and turning it over a few times by hand or with a wrench. This new tester will operate any kind of rotating magneto—except the flywheel types—at all speeds and in either direction. For testing impulse couplings and the lag angle, there's a cross shaft that runs at one-tenth of motor speed, so it's possible to get them right down to the lowest cranking speeds to observe



"He's been holding it ever since I held it out turning a corner."

the operation. While all this is going on, the sparks are jumping a calibrated, ionized set of gaps that really tells you what's happening, with no guess work left in.

For flywheel magnetos, I made up my own test fixture a number of years back. The coil plate fits on the fixture with the aid of the right size bushing, and the flywheel fits on one of a dozen or so tapered shafts that go with the outfit. The flywheel can then be turned by hand or with a motor mounted under the bench just the same as on the engine it belongs on. This is really a swell outfit for the kind of magnetos that come on outboard motors and some of those other small engines.

For magnetos that don't turn—the kind that bump up and down—we have another rig for testing. Instead of jerking the armature up and down a few times by sticking a screwdriver under it, this machine operates the magneto for as long as you want, and at any speed you want, the same as on the engine.

When it comes to testing magneto coils there are three methods I like to use. The choice depends on the kind of magneto the coil belongs to. You can't test all magneto coils alike because they don't all work the same way or under the same conditions. I find it best to test rotating coils that form a part of the armature on an ordinary generator armature growler. You see, in the magneto, the coil works in an alternating field because, while the magnetic field is always in one direction, the armature rotates and sends the magnetism first one direction and then the other through the core of the coil. By placing the magneto coil in the growler, you get this same sort of action. The coil stands still and the field alternates.

You can make and break the primary circuit by reinstalling the breaker plate and bumping the points apart, or you can leave the interrupter fastening screws in place and

(Continued on Page 60)

## PRODUCTION COUNTS!

# AIRTEX



Now that every car and truck is being called on to produce more mileage, more speed—more results, AIRTEX Fuel Pumps are commanding more attention than ever before. AIRTEX Fuel Pumps with the AIRTEX 50,000 mile guaranteed diaphragm are producing millions of miles of economical, trouble-free performance on all types and makes of cars and trucks—are helping to keep America's automotive might at full strength and peak performance. This is no time to guess at performance—use AIRTEX Fuel Pumps for guaranteed results!

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SAVE OIL

*Serve  
Conserve  
Prosper*

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1. Always check oil for DIRT, with AC Oil Test Pads.
2. Urge replacement of Oil Filter Elements when the old ones no longer keep oil clean.

It's an old truth that "he profits most who serves best." You'll benefit your business most by helping customers to run their cars at the lowest cost. Clean engine oil is a MUST—for motoring economy. And . . .

**AC Oil Filters Get the Dirt**

AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION • FLINT, MICHIGAN

JANUARY, 1942

*When writing to advertisers please mention Motor Age*

59

## MAGNETO TEST

(Continued from Page 58)

make and break the circuit by jiggling a screwdriver between the screw and the armature flange. Either way you are interrupting the primary and you can test the spark by means of a suitable gap between the collector ring and ground. Since alternating current is creating the field, and since you won't always make your primary break just when the current is at the peak of the cycle, you won't get a good, strong spark every time,

but, if the coil is good, you'll get your strong spark most of the time.

The other methods I spoke of have to do with stationary coils such as are used in inductor magnetos and those of the flywheel types. These we test with battery current in the primary and use a small motor-driven interrupter for circuit breaking. For magnetos used on multi-cylinder high-speed engines, the high-speed breaker with a six-lobe cam that we use for automobile coil testing is just about right, but it is no good for testing the coils from low-speed, single-cylinder motors.

For the magneto coils used on slow-

speed engines, we have a slow-speed interrupter. The electric motor is geared down so that the interrupter camshaft turns about 166 r.p.m. and with a six-lobe cam it means approximately 1000 r.p.m., which is about right for these engines. You can't get a fair test on a high-speed coil at low interrupter speeds, and you can't expect much if you test a low-speed coil at high speed. Coils are designed for certain types of service and, to get results you can depend on, you have to duplicate these conditions very closely in your testing.

It seems that there's a good bit of uncertainty as to how a magneto condenser ought to be tested. My experience shows that a magneto condenser is just about the same as any other condenser and can be tested in exactly the same manner. A good condenser tester will test for leakage, capacity, and damping. When you use it, pay special attention to the capacity test, because it is more important than on battery system condensers. Why? I'll tell you. With a battery, you have an almost unlimited supply of primary current, but on a magneto you have only so much to start with—and no more. If the condenser has too much capacity—or leakage—it simply means that too much current is being stolen from the primary and that the spark from the secondary will be weakened that much. Then, too, the matter of contact life applies to over or under capacity in magneto condensers the same as it does to battery systems.

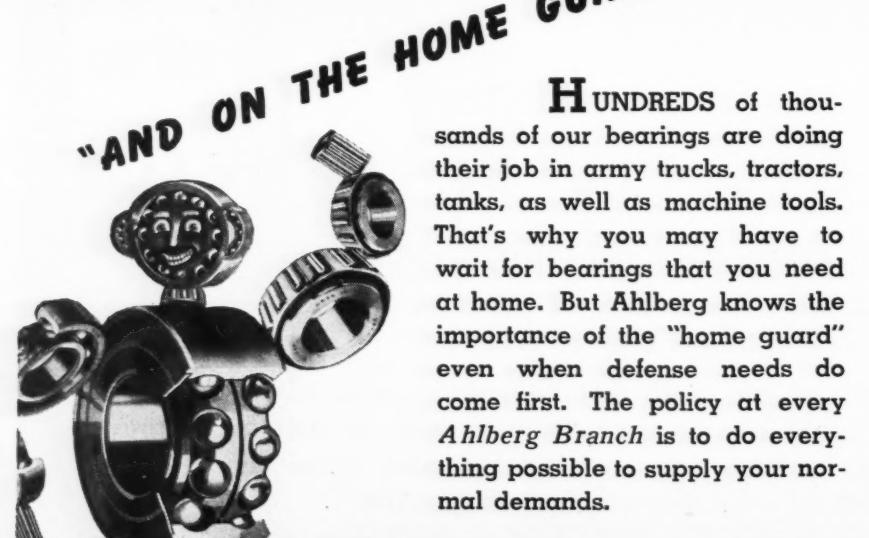
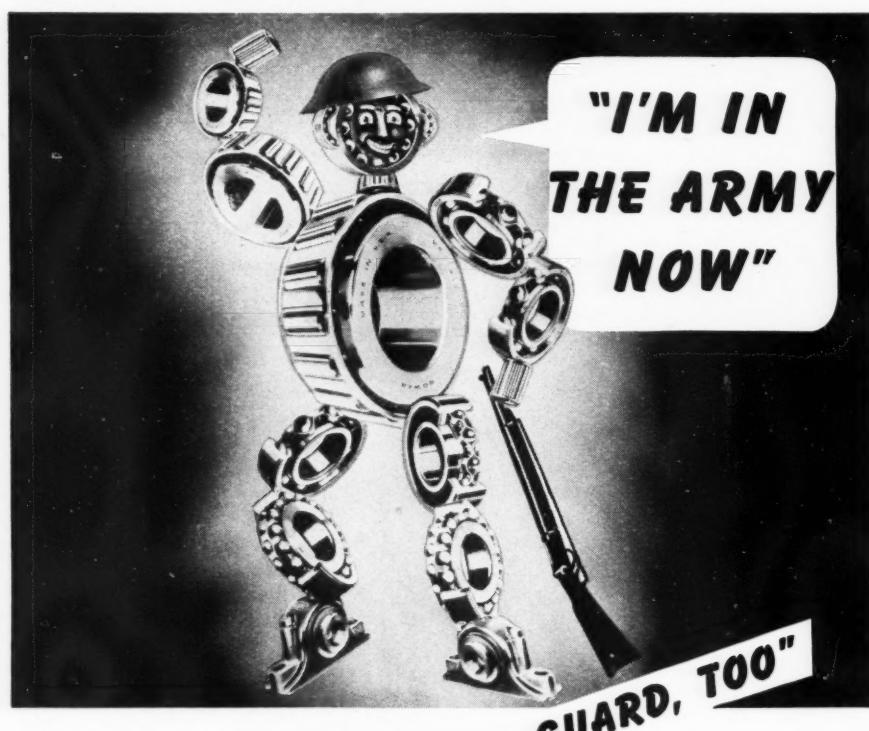
Manufacturers make condensers of just the right capacity for their magnetos, but we're not always so fortunate as to have the right condenser on hand when the pinch comes. Sometimes we have to substitute—especially on the outboard types—and when we do it is well to known capacity and make the right kind of substitution.

There are two other items of equipment every magneto man ought to know about. One is a magnet tester and the other is the magnet charger.

The magnet tester is a very delicate meter that gives you a direct scale reading showing the strength of any kind of magnet. You get to know after a time just about how strong the different magnets should be to give satisfactory service, and with this instrument you don't have to guess about it. You know whether a magnet needs recharging or not.

A strong magnet in a magneto is just as important as a strong battery in a car. The magnet supplies the initial source of energy and, if this source is weak, the spark from the magneto just has to be weak, too. Magnets get weak from a number of causes, such as a sharp bump or jar, standing around without a keeper across the poles, and getting too close to an alternating current field. When a magnet gets weak, there's only one

(Continued on Page 62)



**H**UNDREDS of thousands of our bearings are doing their job in army trucks, tractors, tanks, as well as machine tools. That's why you may have to wait for bearings that you need at home. But Ahlberg knows the importance of the "home guard" even when defense needs do come first. The policy at every Ahlberg Branch is to do everything possible to supply your normal demands.



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AHLBERG BEARING COMPANY

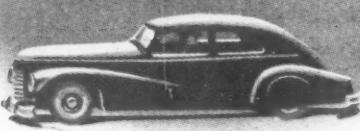
Manufacturers of CJB Master Ball Bearings

3028 West 47th Street - - - Chicago, Ill.



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*—another port-of-call for  
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 In center of picture is the  
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 Mountain."*

## AROUND THE WORLD... . . . and around the town!



**E**VERYBODY agrees that motor oil quality has grown more important with the need for engine conservation.

Can you definitely determine motor oil quality—in your own shop? Not without a laboratory full of testing equipment! But you *can* accept this evidence:

*Pan American Airways, the world's largest international air transport company, has used WOLF'S HEAD*

*. . . FOR OVER 13 YEARS*

*. . . FOR MORE THAN 900,000,000 PASSENGER-MILES*

Still another proof of quality is this: Wolf's Head guarantees the new-car buyer against repairs to lubricated parts for the first 30,000 miles. Wolf's Head Oil Refining Co., Oil City, Pa.—New York, N. Y.

**Be Ahead with**  
**WOLF'S HEAD**  
**MOTOR OILS and LUBES**

100% Pennsylvania P.G.C.O.A. Permit No. 19



## ARMY SHOP

(Continued from Page 21)

and the mechanics' benches and tool cabinets.

The benches are typical but the contents of the cabinets are enough to make any mechanic's eyes pop. Each holds a set of tools, assigned to the man when he is hired, that consists of 110 pieces and costs \$96. Along the same wall is a hydraulic press with a capacity of 60 tons.

When you enter the screen-enclosed machine shop, you automatically pinch

yourself to make sure you're awake. Around the four sides is the most complete array of automotive equipment you're likely to see outside a jobber's.

First on the right as you start to walk around the shop is a wet valve refacer, and next a brake-lining riveter and countersink. Then comes a test bench for generators, starters, and voltage regulators, and just beside it a small lathe for undercutting generators. Finally there is a distributor tester. Along the far side you come first to a clutch rebuilders and then both a reamer and a hone

for wristpins and bushings and a rod aligner.

Returning along the third side you encounter a big 2-in. drill press and a drum lathe. In its own case, you find special equipment for turning down the oversized brake lining used on truck drums after the drums have been turned. It saves the time and trouble of shimming. Then you find a complete set of cutters for reseating valves and a set of micrometers, ranging from zero to 6 in. Close by is a set of taps and dies.

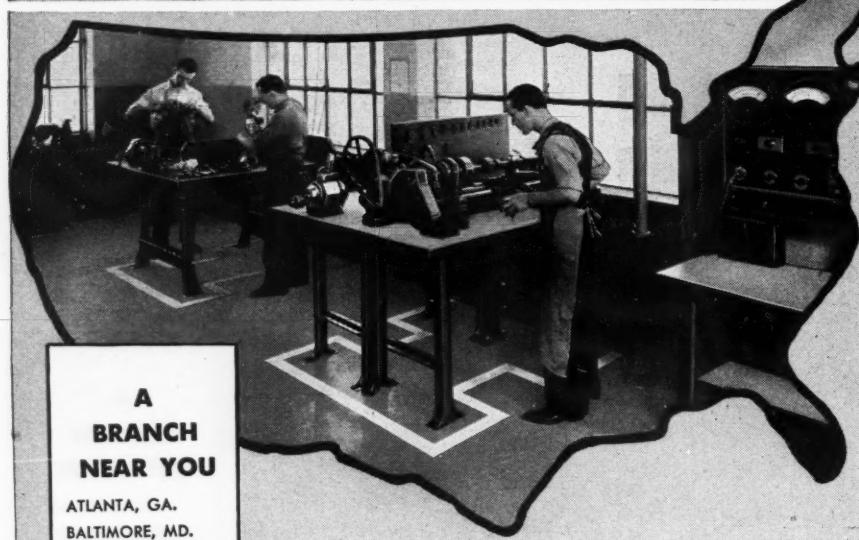
Completing the circuit of the machine shop, you see an engine lathe with a 4-ft. bed and 7-in. swing. Here commutators are turned down, axle shafts and so on checked for bending and out-of-round, and regular machining operations carried out.

This side of the Motor Transport Building has its own wash room and lockers, and it is on this side that the roomy office is located.

The shop operates on a 24-hour basis, for many of the depot's motor vehicles are in continuous service. Besides, a truck or car in an Army convoy passing through the Philadelphia area breaks down occasionally and it is the Motor Transport's job to go out and repair it or tow it in.

One of the finest of the Army's automobile repair shops is expected to render nothing but the finest service.

## FAST REPAIR SERVICE



### A BRANCH NEAR YOU

ATLANTA, GA.  
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By keeping your Van Dorn Portable Electric Tools operating at top efficiency all of the time, you can move more jobs from your shop.

Luckily, as a Van Dorn owner, you don't have to send tools "back to the factory" for repairs. One of our 26 factory-owned Service Branches is near you, equipped for efficient and fast work, with factory-trained mechanics and genuine replacement parts. And every servicing job is backed by Van Dorn's guarantee. The Van Dorn Electric Tool Co., 727 Joppa Rd., Towson, Md.

**"Van Dorn"**  
(DIV. OF BLACK & DECKER MFG. CO.)  
PORTABLE ELECTRIC TOOLS

## MAGNETO TEST

(Continued from Page 60)

remedy and that's to charge it back to full strength. Some of these new magnetics, made from special metals, hold a charge better than the older types, but I've seen some weak ones too.

When it comes to magnet chargers, I want one with plenty of copper wire, large-sized cores and more input than you can coax out of a six-volt battery. Remember when all cars were fitted with the kind of grease cups you had to fill with a stick and screw down by hand? Well, there is as much difference between a really good magnet charger and one of the old-style cheap chargers as there is between the old-fashioned grease cups and the new high-pressure lubricating outfits.

As I remarked before, magnetics are back and will be with us for a long time to come. There's going to be some money made in magneto service, not only for the shops but also for the men who hone up on magnetics and learn how to repair them.

### Perfect Circle Dividend

The directors of The Perfect Circle Co. declared a dividend of 60 cents per share on the 162,500 shares of outstanding capital stock of the company on Dec. 1, 1941. The dividend is payable Jan. 1, 1942, to stock of record at close of business Dec. 12, 1941.

# EVERYBODY'S TELLING YOU

Your Lubrication and Service Sales Must Increase During 1942

## WE'LL HELP YOU DO IT!

# All Your People Get On the Service-Selling Job

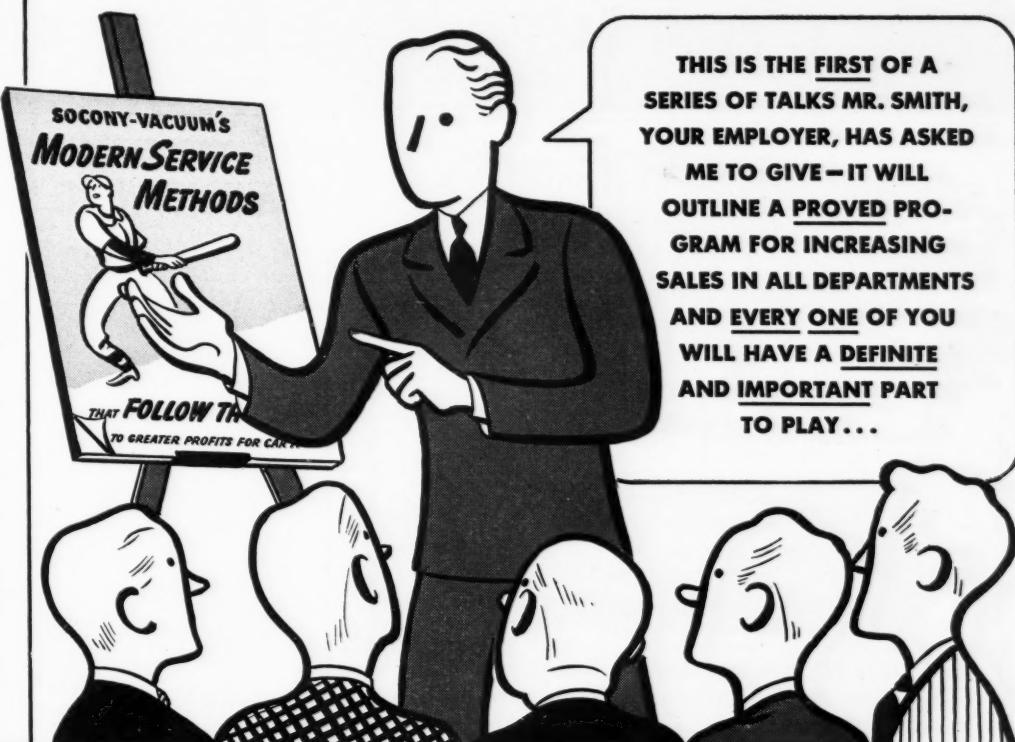
### THE SCENE AT THE RIGHT WILL OCCUR IN YOUR PLACE OF BUSINESS:

A SOCONY-VACUUM specialist will coach your employees—with Actual Movies, Slides, Charts, and Demonstrations—in selling methods that mean more business for you!

### FACTS ON "MODERN SERVICE METHODS"

- Unique Training Course—Everyone in your organization is carefully trained in Modern Service Methods by Socony-Vacuum specialists.
- Your Market is Carefully Surveyed to calculate the future growth of your business.
- Your Present Layout is Studied—We suggest improvements in your equipment and in the arrangement of your establishment.
- Sales Promotion—We offer hard-hitting sales promotion pieces to push your service specials...bring in new customers.

Socony-Vacuum Oil Co., Inc. and Affiliates—Magnolia Petroleum Co., General Petroleum Corp. of Calif.



WRITE TO CAR DEALER DIVISION—SOCONY-VACUUM OIL CO., INC., 26 BROADWAY, N. Y. C., FOR FACTS ON

# SOCONY-VACUUM'S MODERN SERVICE METHODS





## "We've Got to Keep 'em Rollin' Longer— These Short Cuts Save Time!"



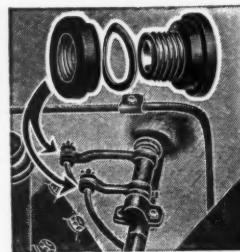
No. 416 Phillips Self-Tapping Auto Body and Trim Screw Assortment for all cars and trucks

Cut their own threads and provide a tight fit that will not jar loose. Phillips head screws are used on all trim of most late model cars. Complete specifications in lid of box. Two hundred and thirty-two screws and speed nuts in this assortment No. 416. Also assortment MB416 in metal container with 464 pieces. List 4c per screw

No. 417 Fibre Washer Assortment

This assortment contains 8 sizes of fiber washers generally used on carburetors, fuel pumps, generators and places where a gasket or insulating washers of fiber are used. 300 washers to assortment. List 1c each

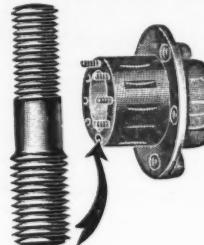
Order from Your Jobber



No. 414 Gear Shift Lever Bushings

These fibre insulated bushings replace the standard rubber bushing and make a permanent repair. Can be easily installed without removing the gear shift lever arm. For 1940 (late), '41 and '42 Fords and Mercury.

List 30c each

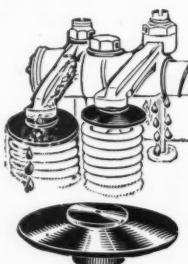


No. 407 Oversize and Standard Rear Wheel Studs for all trucks

These oversize studs are used where threads are stripped or stud is broken off; or where wheel flange holes and axle flange holes are worn. Sizes to fit all popular trucks.

Nos. 407-A, B, C, F, G & I ..... List 20c each

Nos. 407-D, E, H ..... List 35c each



No. 455 and 955 Oil Regulator and Valve Silencing Caps for Buick and Chevrolet

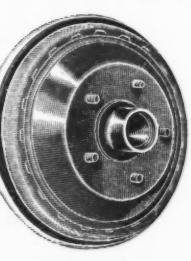
Reduce excessive oil consumption at valve guides. Stops smoking. No sticky valves. No. 955 for all 1935-42 Chevrolet cars and trucks.

List \$2.75 per set

No. 455 for all 1931-42 Buicks.

List \$4.00 per set

U.S. Pat. Nos. 2,222,792—2,241,498.



No. 988-C Brake Drum Spring

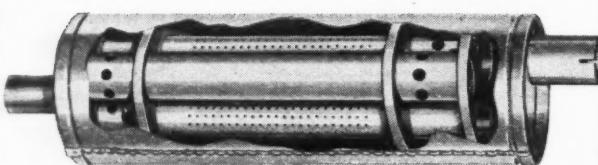
—is designed to stop squeal on Chevrolet drums—made of best material. Easily installed. For Chevrolet and cars with 11" drum. List 65c each. Also No. 988 for V-8 Fords and other cars with 12" drums. List 75c each



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Seems as though everyone  
wants "HAVILAND'S"  
**O.K. Super DeLuxe**  
**MUFFLERS**



With only 24 hours in a day . . . 7 days in a week, it has been impossible for us to keep up with the tremendous demand for O.K. Super Deluxe Mufflers.

We insist that every muffler bearing our label meet with the rigid requirements of our engineering and inspection departments in order to insure lasting satisfaction to jobber, dealer and user.

We regret that we have been unable to take care of all your requirements.

MANUFACTURED AND GUARANTEED BY  
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## WONDER WELD STOPPED THE LEAK!



Miller Manufacturing Company  
Camden, N. J.

I was racing this past season with the WONDER WELD racing team, Buddy Callaway and L. J. Callaway, and at one of the race meets I developed a water pump leak and Buddy suggested my using some WONDER WELD to stop it, which I did. I was very much pleased with your product. Not only did it stop the leak but I haven't had any trouble since. Since then, I have had on hand plenty of WONDER WELD in case of any emergency which might arise. I cannot praise your product too highly.

Yours truly, *Dave Champean*  
USE WONDER WELD THE EASY PERMANENT SEAL  
THAT IS WIDELY IMITATED BUT NEVER EQUALLED.

**MILLER MANUFACTURING CO.**  
1100 N. 32nd Street, Camden, N. J.



# Thousands of Automotive Maintenance Shops Buy and Use Each Annual Edition of the CHILTON FLAT RATE and SERVICE MANUAL

**These are the most successful shops. They are the ones that make the most money. They do over 85% of the total repair and tune-up work on the Nation's 30 million cars and trucks.**

## WHAT THESE SHOPS SAY

They freely admit that a large measure of their success is due to their use of the Chilton Manual. "Could not stay in business without it"; "Impossible to know all the necessary facts this Manual supplies"; "Tells us how to charge and how to do every job"; "These are typical of the hundreds of comments from users. One shop recently wrote they had continuously lost money and were headed for bankruptcy when they began to use the Chilton Manual, and that today they are the leading shop in their locality, and are making money."

## OVER HALF MILLION MANUALS SOLD IN 16 YEARS

This 1942 edition is the 16th edition. No Manual could survive for 16 continuous years unless it rendered a worthwhile service, because most of each year's users are the same shops that have used it continuously. And no Manual totals more than a half million copies distributed that has not delivered value to its users. The Chilton Manual holds the record for length of life and volume of copies sold of any Manual in the automotive field, if, indeed, not in every field.

## YOU CAN HAVE CONFIDENCE IN CHILTON INFORMATION

A Manual that supplies charges for labor and material must be accurate or you would lose money using it. A Manual that directs you on service procedure must supply reliable data or you would lose more than you would otherwise. Therefore, the only Manual to buy and use is a thoroughly trustworthy one. The Chilton Manual was the first Manual of its kind to be issued. It is the oldest service of its kind. It is the largest. More shops use it than any other Manual. It has long since become a respected institution of the maintenance trade. You can trust the Chilton Manual.

## REASONS FOR ITS RELIABILITY

The main reason is the Company behind it. Any Manual of any kind is nothing more or less than the concern that produces it. The Chilton Manual is a property of the Chilton Company, and the Chilton Company is the oldest and largest automotive trade publishing organization in the world.

The second reason is the men who make it. Chilton employs more editors than any other publisher. 10 men work all year to produce this Manual. All 10 are practical mechanics, former shopmen themselves, who work out the problems and get their answers in the grease.

The third reason is that Chilton Editors themselves study these jobs they price, and the work they describe as to the best procedures. This Manual is not a paper and scissors compilation of material taken from every available source. It is original material that our Editors prove is correct to their own satisfaction before releasing it.

The fourth reason is that the Chilton Manual is printed in the Chilton Plant by the same printers who have now worked on 16 editions. None of the work is "farmed out" to other printers. We are the only publisher that prints such a Manual in its own Plant. This system keeps mistakes down to the absolute minimum.

## SUPPLIES BOTH CHILTON RECOMMENDED FLAT RATE LABOR PRICES AND FACTORY PRICES

Every repairman knows that he cannot make money on factory prices. He doesn't have to use them if he has a Chilton Manual. This gives him Chilton Prices, far more accurate and closer to the correct amount he should charge, but if he wishes to use factory prices, they are also given in the Chilton Manual.

## NEW \$2.00 PER HOUR FLAT RATE LABOR CHARGE

The 1942, or 16th Edition labor charges are based on a \$2.00 per hour rate. The rate for years has been \$1.80, but the new rate was used because of increased labor costs. Any rate in a nationally used Manual must be one that represents the average of all labor charges all

over the country. For the benefit of those shops that will charge less or more than \$2.00 per hour, a conversion table is supplied, as always, making it easy for anyone to decrease or increase the total job charge as per his own individual labor charge.

## ALL JOB CHARGES REVISED

Every flat rate page in Chilton's 1942 Manual has been completely revised for the \$2.00 rate, and all Chilton job charges have been brought up to date.

Every parts price page in the Manual has been entirely revised in accordance with the very latest prices issued by parts manufacturers. This is an entirely new Manual in every respect. Do not therefore figure that if you have the 1941 Chilton Manual that it will do. You must have the 1942 Edition, especially in view of the present conditions, that call for the most recent information. The surest way to lose money is to try to save the small amount that you pay for the most recent Chilton Manual.

## LABOR PRICES AND MATERIAL COSTS ON ALL CARS SINCE 1936

There is a price for every kind of repair job on every make and model for 7 years. All flat rate information on cars manufactured in 1936, 1937, 1938, 1939, 1940, 1941, 1942. And tune-up tables supply tune-up data on all makes and models back for 10 years, and in some cars, farther back than that.

## ALL THE LATEST FACTS ALL THE 1942 PRICES AND DATA

Everything—every price and fact you'll need to know. Some 1942 parts prices even are included, although complete 1942 parts prices will be sent users in a separate supplement later, when the prices have become sufficiently complete and settled to issue.

## 33% MORE PARTS PRICES

A tremendous number of parts prices have been added to this issue, and most of these additions are body parts prices, for which there is such a demand. And there will be many pages of Body Repair Flat Rate prices also. There are 34,500 Body and Wreck Parts alone. There are 390 parts per car model. There are 128 pages of Body Parts.

## 45,000 TRUCK FLAT RATE LABOR PRICES

The Chilton Manual not only supplies labor charges on all makes and models of passenger cars back for 7 years, but in addition furnishes the largest amount of labor prices on truck repairing available anywhere. Nowhere else, in any one Manual, is assembled 45,000 truck flat rate labor prices such as the Chilton Manual contains. With truck repairing the most profitable of all repair work, and with the present defense necessity for efficient and speedy truck repairing, this one part of the Chilton Manual makes it invaluable.

## BODY OPERATIONS—FLAT RATE CHARGES

These are so extensive that they run into 44 pages of text, covering all makes and models of cars made in 1936, 1937, 1938, 1939, 1940, 1941 and 1942.

These body operations charges are extremely important with body and wreck work being done in constantly increasing volume.

## EASIEST SYSTEM TO USE

The Chilton Manual has always been the easiest to use. It is deliberately kept simple in arrangement to save its users time. One illustration of this is our placing parts prices across the page from the complete job prices. Each left-hand page has the parts prices. Each right-hand page has the Flat Rate job charges so everything is all together—visible at a glance, not separated into two sections, that would compel you to refer back and forth endlessly.

In the 1941 edition, we arranged the Service material instructions both by make and model of car and by units, and cross indexed both. This method has won such approval that it is being continued in the 1942 Manual. Now, in addition, we have placed the Quick Reference Tune-Up Data together with the major over-haul information.

**Wait for your Chilton man to call**

**BE SURE THE NAME CHILTON IS ON THE MANUAL YOU BUY**

## PRESSURE GAGE

(Continued from Page 25)

"A whole lot," said Pop. "That's why they have to put superchargers on airplanes that have a high ceiling. And air pressure varies from day to day. It's higher on bright, clear days than it is on muggy ones. Besides, the air that's sucked into a cylinder has to pass the air cleaner, the carburetor, the manifolding and the valve port. The friction tends to hold it back. So the amount of the charge that actually reaches the cylinder is reduced and the pressure at

the beginnin' of the compression stroke is less than the pressure of the atmosphere. That's what engineers call 'wire-drawin' effect."

"I never heard it called that before," said Chuck.

"Throttlin' effect is another name for it," said Pop. "All it means is that the charge loses pressure as it makes its way through the different passages, just like wire gets finer as it is drawn through a die."

"But I don't have to figure all that out, do I? The shop manuals give the right pressures for the different cars."

## Speed Work Thru in '42

WITH  
**Snap-on  
Tools**



Now is when you'll appreciate your Snap-ons! Now is when the sky-high quality built into them really shows up. For when you've got to get in there and "pitch" . . . get those "buggies" rolling . . . your Snap-ons are right in there with you holding up their end. Quick, perfect application to each operation . . . no tight or sloppy wrench sizes. Powerful, stroke-saving leverage . . . no lost motion. Safety . . . no slipping or chewing the nut. Fast, comfortable handling . . . no time-wasting "weight-lifting". And when you've got to "swing it" hour after hour . . . man! can they take it! Your Snap-ons were built to provide you with peak-performance on every job . . . they were made to save time, lighten work, improve workmanship . . . to stand up under the heaviest going, for weeks, months, years. They're just the ticket for today's emergency . . . vital to victory! Speed work thru in '42 . . . with Snap-on Tools! See your Snap-on salesman or write . . .



**Snap-on  
Tools**

*The Choice of Better Mechanics*

**SNAP-ON TOOL CORPORATION**  
8036-A 28th Avenue Kenosha, Wisconsin



"Wot'll I do now?—That's what I came to see 'em about—My horn isn't workin'!"

"Sure they do," said Pop. "But you want to be sure you know the engine speeds the figures are given for. Some manufacturers give the compression pressure at speeds of 1000 to 1500 r.p.m. Others give it for crankin' speeds, which are only 160 to 170 r.p.m. If you put the gage on an engine that was turnin' over at crankin' speed when the figure in the manual was given for 1000 r.p.m., you'd get too low a readin' and might think somethin' was wrong when it actually wasn't."

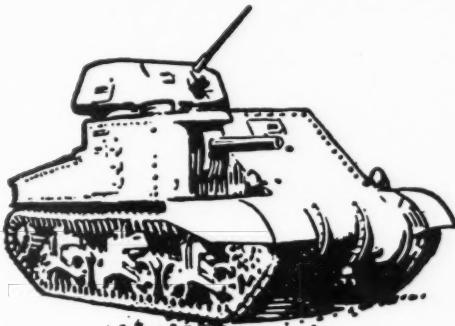
Pop was really getting warmed up to his subject now. "There's another thing about pressure," he said. "You learned in your high-school physics that any gas gets hot when it is compressed and that a gas expands as it's heated. Well, that applies to the mixture that enters a cylinder, too. Suppose you compress the mixture that occupies a certain space into a space that's only half as big. The pressure wouldn't be just twice as much. It would be more, because the heat created by compressin' it would give the mixture a tendency to expand and that would increase the pressure. At higher engine speeds, this heat don't have as much chance to escape as it does at crankin' speeds. So the heat wouldn't build up as much pressure at low speeds."

"Then," asked Chuck, "would it be even better to crank the engine by hand instead of usin' the starter? The heat would have more time to escape."

Pop shook his white-thatched head. "No. When you pull the engine over by hand, too much pressure leaks past the piston and valves. You wouldn't get anywhere near a correct readin'. As far as I'm concerned, the

(Continued on Page 68)

# What your defense dollars buy



ball team. It is the "break-through." Head-on, it crashes timber, houses, enemy fortifications. Once it has opened the way, the attacking force follows for the "mopping up."

The Nazis, using these great steel pachyderms which they produce in vast quantities, have been able to break through every fortified line in 14 conquered countries.

In America, the medium-sized tank is the popular size. A medium-size tank weighs 30 tons. To make it takes as much steel as would be used in 500 refrigerators, as much rubber as goes into 87 average automobile tires.

The planning of a tank takes as great skill as a large-scale construction job. One recently converted automobile plant, faced with retooling for tank production, had to put 200 engineers to work in day and night shifts for one month, mapping out machinery requirements and plant layout.

To match the mechanical might of aggressor nations today, America needs thousands of these tanks. They're rolling off the assembly lines now. They cost real money. Every time you buy an \$18.75 Defense Savings Bond or a 10¢ Defense Saving Stamp, you give your country money enough to buy a vital part for another new tank.



## BUY DEFENSE SAVINGS BONDS and STAMPS

AT ALL BANKS, POST OFFICES, AND SAVINGS AND LOAN ASSOCIATIONS

Surrounded by vocational students of Central High School, South Bend, Ind., is a brand-new 1942 Studebaker Champion chassis, donated to the school for its vocational classes. Shown, left to right, are D. O. Wilson, Studebaker service director; Sterling M. Pierce, instructor; C. D. Scott Fletcher, Studebaker sales manager, and P. D. Pointer, the school principal.



*Save up to 40¢ out of every repair dollar!*

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**HYPRESSURE JENNY**  
**Steam Cleaner**

Where mechanics work on dirty, greasy engines, chassis, transmissions, parts, etc., Hyppressure Jenny Steam Cleaning before repair saves up to 40 cents out of every dollar of labor cost. As the first step in your car reconditioning program, Hyppressure Jenny Steam Cleaning will help

you get \$15 to \$50 more for used cars. Also, with Hyppressure Jenny, you can do many extra profit-service jobs such as motor and chassis cleaning. Don't put off gathering these extra dollars any longer! Find out now how much Hyppressure Jenny can save YOU. Send for free survey.

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CORAOPOLIS, PA.

O. K.—Send that Survey.
We recondition, repaint, repair.....cars or trucks monthly.
We employ.....mechanics on dirty, greasy repair work.
NAME.....
ADDRESS.....



## PRESSURE GAGE

(Continued from page 66)

best speed for takin' a pressure test is crankin' speed. I've got a table of the late-model cars in the office. I worked it out so all the pressures are given for crankin' speeds. You better look at it any time the pressure for the engine you're workin' on is given in the manual for higher speeds."

Chuck reached for the old head gasket. "I sure will," he said. "I want to learn this repair game right."

"That's the spirit," said Pop, smiling. He handed the gage to Chuck. "There are just a couple more points you want to keep in mind. Always be sure your battery is in good condition. If it ain't, it won't turn the engine over fast enough. And be sure the carburetor throttle is open all the way.

"I guess I don't have to tell you that you mustn't jump at conclusions—not after the way you spotted that leaky gasket. But you do have to keep all the things I've told you in mind. If there's a big drop in pressure from what it says in the manual, chances are the pistons or the rings or the valves are in bad shape. A few pounds don't make much difference as a rule. The thing to watch in that case is that there ain't too much variation between the cylinders of the same engine. If there is, you're goin' to get vibration."

Chuck took a step toward the parts room. "Thanks a lot," he said. "I'll do my best."

As Pop walked back to the office, he sighed. "I was beginnin' to be afraid," he admitted to himself, "that they didn't raise kids like that any more."

### Takes Branch Office

The promotion of E. R. Goss to branch manager of its El Paso, Texas, branch office has been announced by H. A. Jackson, president of Chicago Pneumatic Tool Co. Goss succeeds E. J. Coughlin, former manager of the branch, who was killed in an automobile accident Oct. 14.

## BATTERIES

(Continued from page 28)

and on Sundays and holidays, there is a regular charge, regardless of whether the owner subsequently has his battery recharged or buys a new one.

This shop also considers that insuring long life for the batteries it sells is part of the service a customer can reasonably expect. Whenever a new battery is placed in a car, the battery man makes sure that there is no fault in the electrical system that might weaken it or burn it up in a short time. This does not mean that every detail is inspected on every car. Usually, the man who buys a new battery has driven for a day or so with a rental. The rental is tested when taken from the car, and, if the charge is less than it should be, the system is checked. Work necessary to correct the condition is recommended to the owner, who usually authorizes it. This class of work is an important part of the shop's general repair volume.

One of the commonest troubles on late-model cars is overcharging, due to a defective voltage regulator. To meet this situation, Automotive Service recently purchased a sensitive volt-amp meter for testing regulators. It believes that no shop that hopes to run a successful battery business today can hope to succeed in the long run, that is, make repeat sales to old customers, unless it is in position to test voltage regulators and adjust them.

Repeat sales are one of the biggest factors in the battery volume of Automotive Service. That is the reason it has not had to push service and sales of batteries in the last several years. The only advertising it does is generous space in the classified telephone directory. That brings in a good share of new business. The rest comes from satisfied customers.

## PARTS CLEANING

(Continued from page 32)

When the parts are removed they should be rinsed in a solution that will remove the cleaning compound. The solution best suited to a rinse is any one of the cleaners sold through the local filling station, primarily for dry-cleaning purposes. This rinse naturally absorbs a certain amount of the original cleaning compound as it washes it from the parts. When it no longer serves as a good rinse, it can be used as a flushing solution for flushing transmissions, differentials, etc.

After the parts have been rinsed, they can be blown dry with air. With everything perfectly clean, it is pos-

sible to make a good inspection of the various parts to determine which, if any, should be replaced.

With the carburetor reassembled, new parts where needed and all other parts as clean as new, the mechanic is able to get a really accurate setting so as to give the owner maximum performance and economy of operation.

### Repair Finance Plan

#### Offered Dealers by C.I.T.

To franchised automobile dealers from coast to coast, the C. I. T. Corporation has made available a new

installment-payment plan to enable car owners to have their cars overhauled and otherwise renewed and to pay for the work over a period of 12 months. Rate charts, literature, and other material to make the plan operative have been distributed to dealers by C. I. T.'s 250 branch offices from coast to coast.

Renewal and repair work that a car owner may finance under the plan include the following: Motor overhaul, body repairs and painting, new tires, lights, brake work, transmission, glass replacement, and wheel alignment. The plan starts at a minimum of \$30 and runs to a maximum of \$300.



### ... and Keep America's Key Transportation Rolling

- Here's your opportunity to help win the war right in your own shop!

Every Tune-up job is the "Care" that will save America's cars and materials. Tie-in with the nation's greatest need—automotive conservation—by selling "America's Finest" Tune-Up with Genuine NIEHOFF Parts.

This complete campaign—"Care Will Save Your Car" can be yours *free of charge*. Send for full details Today!

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LAPEL BUTTON POSTER STAMP



WALL STREAMER



CARE WILL SAVE YOUR CAR  
Use NIEHOFF IGNITION PARTS

# NIEHOFF



## DETROIT LETTER

(Continued from page 41)

Output of synthetic rubber in 1941 totaled 12,000 tons and the four new plants are designed for annual production of 40,000 tons. Plans are now under way to triple the capacity of these plants. However, all these projects will not help the immediate need for crude rubber.

U. S. crude rubber stocks were estimated at 620,000 tons as of Jan. 1. In 1940 the automobile industry alone used 518,800 tons, or 80 per cent of

the rubber consumed in the U. S. Therefore, the stock on hand represents less than a year's supply for peacetime needs, and military needs have greatly increased the requirements. Hence the OPM order to curtail production of civilian rubber items, including passenger car tires, in the interests of conserving the nation's rubber for war use.

An average passenger car requires about 45 pounds of rubber for four tires and tubes, but more than half of this is reclaimed rubber. An additional 25 pounds of rubber per car is required for engine mounts, radiator

hose, body insulation and similar items. An average of 33 lbs. of reclaimed rubber also is used per car. Monthly production of 100,000 passenger cars would require about 3,300 tons of crude rubber, whereas all U. S. civilian consumption is being limited to 10,000 tons per month by Leon Henderson. Replacement tire needs, which constitute two-thirds of the tire market, would be additional, along with requirements for civilian trucks, not to mention the other civilian uses.

Unless the Japanese invasion of the Malay Peninsula causes undue interruption of the rubber trade, the cargoes of crude from the Far East may be shipped via the Atlantic and Indian oceans and around Cape of Good Hope to avoid Japanese warcraft.

The situation regarding other automotive materials from the Far East, such as tin, tungsten, manganese and tung oil, is not so critical because there are other sources of supply or the automotive engineers have discovered adequate alternate materials. However, the copper and steel situations remain critical, both being vital for armament production. Manufacturers are experimenting with steel as a substitute for copper in radiators to conserve the latter metal but these remain to be proved. Steel is an absolute necessity for automobile production, along with rubber, and any shortage of steel created by defense priorities will mean a consequent reduction of automobile output.

Despite curtailed passenger car production in the last five months of the year, automobile output in 1941 topped the five million mark to become the second biggest year in the industry's history. Production in the U. S. and Canada totaled approximately 5,100,000 vehicles, exceeded only by the 5,621,715 units produced in 1929. The 1941 total represented a 9 per cent advance over 1940 production. December output was estimated at 292,000 units, the lowest for the month since 1934 and a decline of 42 per cent from December, 1940, when 506,931 passenger cars and trucks were assembled. The OPM passenger car allotment of 204,848 units for the month was cut one-fourth to 153,636 units after the outbreak of war with Japan. Likewise, January's passenger car quota was cut one-half to 102,424 vehicles, but was later revised upward from January, 1941.

U. S. retail passenger car sales for November were down 41 per cent from the previous year, totaling 198,271 units, according to the AMA. However, this marked an 8 per cent gain over October's total. November retail truck deliveries of 64,934 vehicles showed a 14 per cent gain over the same month of 1940. General Motors retail sales in November were 126,281 units, a decline of 30 per cent from November, 1940, and the lowest for the month since 1937.

# TOPS...AND HOW!

## HOLLOWELL STEEL BENCHES

Take just one feature of these famous "Hollowell" benches—tops.

They're available in smooth, indestructible steel...attractive laminated wood...Masonite...or a combination of these in a wide range of sizes. Talk to the mechanics who use them and you'll discover "Hollowell" tops are tops!

But tops aren't all.

Rigidity without costly bolting to the floor...extra sturdy construction throughout...interchangeability of parts for quick and comprehensive rearrangement of benching...are added advantages available in each of the 1,367 bench styles and models in the "Hollowell" line.



Pat. & Pat's Pending  
Drawers are extra

These prefabricated benches are THE answer to requirements wherever there's work to be done. Catalog is yours free on request. Write—

**STANDARD PRESSED STEEL CO.**  
JENKINTOWN, PENNA. BOX 561

BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO



James D. Mooney

### James D. Mooney Called to Active Duty by Navy

James D. Mooney, vice-president and a director of General Motors, has been ordered into active service of the U. S. Navy as of Jan. 1, 1942, it has been announced by Alfred P. Sloan, Jr., chairman of General Motors. Mooney has been a Lieutenant Commander in the U. S. Naval Reserve since 1937. Beginning Jan. 1, he will head up the production engineering section of the Bureau of Aeronautics, U. S. Navy.

During World War I, Mooney served in France as a Captain of the 309 Ammunition Regiment, 84th Division. He is a director of the Navy League of the United States, an honorary member of the Marine Society of New York and belongs to the Quentin Roosevelt post of the American Legion at Oyster Bay, Long Island. His daughter Martha Jane, a member of the British Volunteer Ambulance Corps, is married to an RAF pilot in England. A son, James D. Jr., is a midshipman in the United States Naval Academy at Annapolis.

### NEWS

(Continued from page 42)

doubt true that a car that has been tuned up to operate on high-octane fuel will give greater mileage than it would otherwise. But it is a rare car that has been so tuned. The average owner will get as much mileage with war-time fuel as he did before.

Pinging is another matter. Harmful mechanically when it is continuous or excessive, it also saps the power of an engine, and servicemen should have no trouble persuading owners that their cars should be adjusted to operate on the new fuel. This can be done either by retarding

the timing or by decreasing the compression ratio. The simplest way to achieve the latter is to use two head gaskets instead of one. The alternative is a new head, which is not only an item of considerable expense but something of a job in these days of shortages. In every case, owners should be warned that a change in compression ratio will rob a car of some of its snap, particularly on acceleration.

One thing servicemen should impress upon owners is the fact that all gasoline that knocks will not necessarily be the same quality. Anti-knock characteristics are, after all,

only one factor in gasoline quality. A gas that possessed higher volatility before the rationing of tetra-ethyl lead will continue to possess it, just as gasolines that contained impurities that resulted in gum or other difficulties will continue to contain them.

### STRETCHING RUBBER

ANNUAL consumption of virgin rubber in the United States amounts to about 600,000 tons. According to plans now being discussed, 120,000 tons will be allocated for

(Continued on page 72)

**FOR WANT OF A DROP....**

For want of a drop of oil at the right time and place many new machines have been seriously damaged during initial run-in following assembly . . . To avoid this waste, more and more manufacturers depend upon "dag" colloidal graphite . . . Send for Technical Bulletin No. 112S and name of local supplier.

**ACHESON COLLOIDS CORPORATION**  
PORT HURON, MICH.

"dag" is a registered trade-mark of Acheson Colloids Corporation.

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REG. U. S. PAT. OFF.  
ACHESON  
COLLOIDS  
PRODUCTS

## NEWS

(Continued from page 71)

civilian use this year. Those two figures give a concise and striking picture of the situation that confronts tire buyers for the next 12 months, provided the situation in the Far East grows no worse.

Washington's announcement that tires for civilian use would be rationed seemed at first to be unduly stringent, but events since then have revealed that the action was exceptionally far-sighted. Outbreak of war with Japan imposed an immediate

burden on Pacific shipping and the original ban on rubber was probably motivated by a desire to save shipping space more than by a fear that the rubber-producing lands of Malaya and the Dutch East Indies would be overrun by the Japs. At the time of going to press, the British were being pushed farther and farther down the Malay peninsula and the Jap had already effected landings on Borneo. The rubber plantations, supplying about 86 per cent of the world's supply, seemed to lie within the Jap's grasp.

The situation developed so suddenly and revealed so many unexpected

angles that the OPM had not been able to formulate any hard-and-fast rules about rationing. There is no desire to visit hardship upon anyone, but conservation of our present stocks of raw rubber, said to be about a year's supply, was imperative. A great many persons are going to go without new tires. Just who is to get them has not yet been decided. Defense will necessarily take precedence.

Meanwhile it is certain that the average citizen, without claim to special consideration, will find it almost impossible to obtain new tires. Since cars must be kept running, this means that some substitute for new tires must be found. This immediately suggests recapping and retreading. Shops that have recapping and retreading equipment face a period of intense activity and the sale of retreaded and second-hand tires will soar. To maintain anything like a reasonable volume of business, shops that have sold new tires are faced with the necessity of swinging over to tire rebuilding.

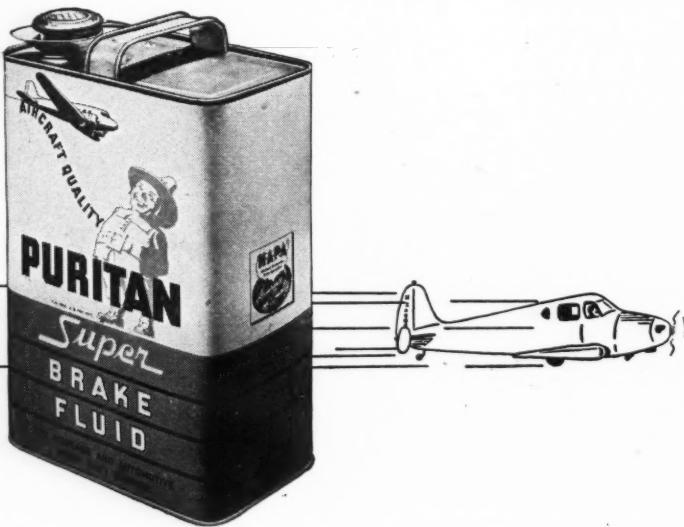
So far as the car owner is concerned, this will be only a partial solution of his problem. He cannot have every tire retreaded when original tread is worn. Experience of tire retreading shops has shown that a fair percentage of tires sent in for rebuilding are rejected, either because the cords are worn or because of carcass damage. Unable to replace a tire by retreading, the owner must purchase one that has been retreaded.

Dependence upon new tires made of reclaimed, or reenergized, rubber may be necessary but the supply of this material falls woefully short of needs. Cheaper tires and other rubber goods have annually consumed about 200,000 tons of reclaimed rubber. Stocks in this country now amount to about 400,000 tons. Further, tires made entirely of reclaimed rubber will be of a quality far below that of tires made of virgin rubber. One maker has warned against driving faster than 35 miles an hour on such tires and places their life at 12,000 miles.

It is not certain as yet whether such tires will be made available to the general public. One indication that they might be is hinted at in the suggestion made in some quarters at Washington that a nation-wide speed limit of 35 or 40 miles an hour be adopted.

Substitutes for natural tree rubber are nowhere near adequate. Synthetic rubber production has been stepped up tremendously in the last year and during 1942 is expected to reach 69,000 tons annually. This is equal to less than two months' rubber consumption during normal times and is even less important with the Army taking such huge quantities of natural rubber. Further, certain of the synthetic rubbers have been placed on the list of critical materials, on which the military has first call.

Guayule, the Mexican shrub which  
(Continued on page 73)



### Made to Meet Aircraft Safety Requirements and Available for Automotive Use

The same features that enable Puritan SUPER to meet exacting aircraft safety standards, make Puritan your best bet for heavy duty automotive use: Highest boiling point of any fluid on the market, absolute safety to rubber, non-gumming, absorption of condensation, complete miscibility with other fluids when used for refill. Yet Puritan SUPER costs little more than ordinary fluids!

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**Garage owners and service men!** Use Puritan and enjoy better satisfied and safer customers, freedom from complaints—peace-of-mind.

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This Decal Now on All  
New Popular Airplanes

BELLANCA PIPER  
CULVER STINSON  
ERCOUPE AND OTHERS



**PURITAN**  
**Super**  
**AIRCRAFT QUALITY BRAKE FLUID**

Poster being distributed by A. Schrader's Sons to automotive service stations to emphasize the necessity of making tires and tubes last longer in war time. Intended for display where car owners may read it, the poster suggests things that should be done and that should not be done in order to prolong tire life.

is now being grown in the United States, produces a satisfactory grade of rubber, but cultivation is limited and no immediate relief from the shortage of the Malayan and East Indian product can be expected soon from that source. It is estimated that 400,000 acres would be required to produce enough to supply U. S. needs and two years are required to produce a crop.

Tires are only the conspicuous use of rubber in automobiles. Rubber has many uses in a car. Among items that must be replaced are battery cases, brake-system parts, spring shackles, engine mountings, wiper blades, and insulated wire. At the moment, production of these parts is limited by OPM order. Whether or not this production is to be slashed further because of the rubber shortage has not been decided.

In the case of batteries, some makers feel that composition cases can be used. This will require redesign in many instances.

Until the rubber plantations of the Far East can be freed of Jap invaders, the wisest course for servicemen seems to be to preach proper tire care to their customers and provide the tire repair service this care demands. Whenever practicable, the service shop ought to be prepared to rebuild tires. That, as long as the situation in the Pacific is cleared up, will be the most promising phase of the tire business.

## HEADLIGHTS

(Continued from page 23)

that headlight, and also so that it is equally divided above and below the horizontal line on the screen. When that light is properly aimed, cover it and aim the other light.

The sealed-beam headlights are provided with two adjusting screws, one to aim the light up and down and the other to aim it to the right or left. These screws are reached by removing the chrome band which is around the front of the headlight. The adjust-

ing screw at the top is for the up-and-down adjustment, while the right-or-left adjusting screw is located at the side of the light.

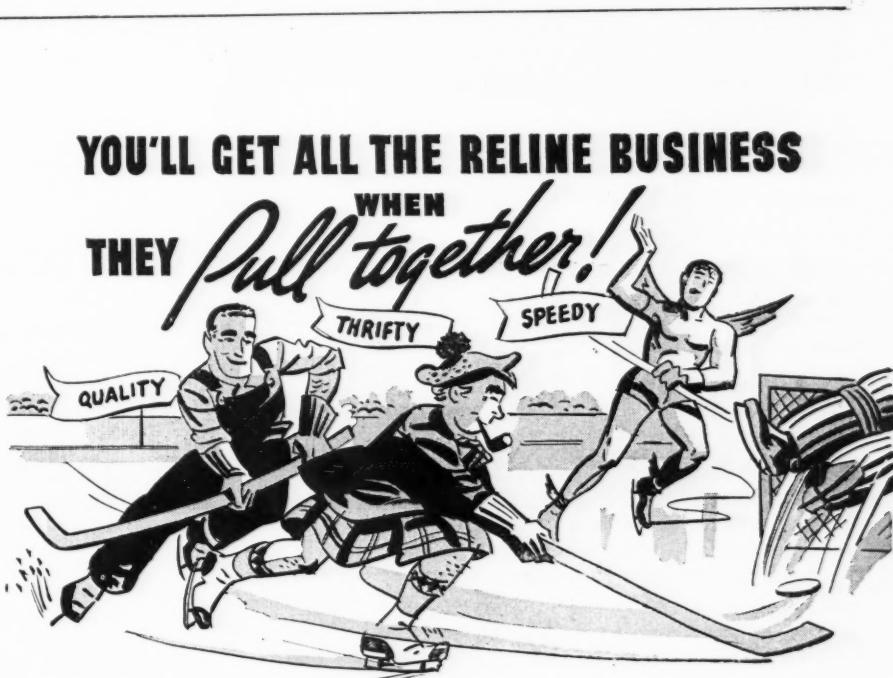
### **Convertible Top Dye**

Converto-Dye, for renewing convertible tops and truck tarpaulins, was developed by one of the world's largest chemical manufacturers. According to the manufacturer, it is not a paint, not a top dressing, but a type of pigmented solution that becomes a part of the fabric. It is water repelling and withstands sunlight and weather. It is applied with

brush or spray gun, and is available in two colors—jet black and olive tan. Converto-Dye is marketed exclusively in the United States by The Mercury Corp., manufacturers of Mercury battery chargers, 221 West 18th St., Kansas City, Mo.

**Named Director**

At a meeting of the board of directors of the Asbestos Manufacturing Co. held at the company's main offices in Huntington, Ind., last month, Sidney J. Black, vice-president, was elected a director to fill the post formerly held by James M. Simpson.

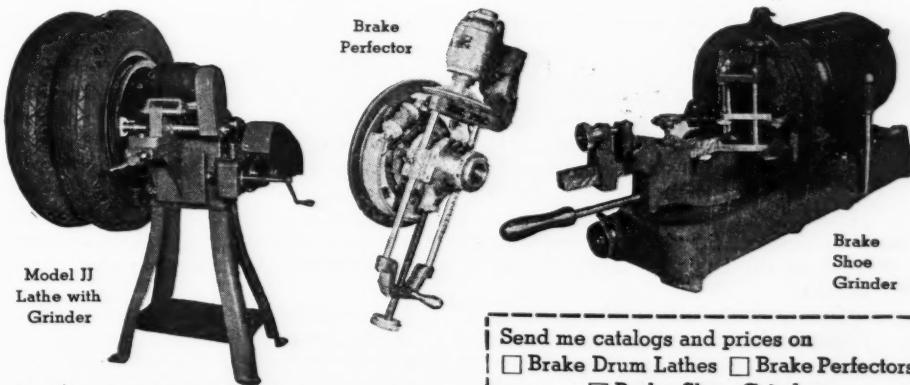


The best defense is a good offense . . . and the best way to reap a big profit from the heavy volume reline business is to equip your shop so that you can really go after this market. Be a specialist in brakes — the best source of revenue in the automotive service industry. Shops everywhere have found out that by installing a Lempco Brake Drum Lathe, a precision Brake Shoe Grinder and a Brake

Perfector, they bring in more business and make more money on every job.

A well equipped shop attracts customers, and you can turn out a better job, faster. When the car rolls out of your shop, you know the job is right. There are no comebacks for free adjustments. Your satisfied customers are your best advertisement.

Ask your jobber for details.



**LEMPCO PRODUCTS, Inc.**  
**BEDFORD, OHIO**

Send me catalogs and prices on  
 Brake Drum Lathes  Brake Perfectors  
 Brake Shoe Grinders

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



# 4-CYLINDERS



PAR 4-cylinder construction means faster pumping . . . lower operating costs. Each slug of air gets two "squeezes" instead of one . . . the multiple cylinders do it without strain or struggle. Smooth, vibrationless operation . . . lower operating temperatures —cut power and maintenance costs to the bone. *Buy PAR . . . and pay less in the long run!*



## Pontiac Introduces "Prescribed Service,"

### Will Take Place of Car-Mileage Plan

The first of the year ushered in "Prescribed Service," the new streamlined service plan for Pontiac owners and dealers throughout the country.

Under Prescribed Service, the traditional method of basing service on car-mileage will be replaced by what Pontiac sales and service heads believe is a more practical plan of service based on the needs of each particular Pontiac car.

For more than a year, Pontiac's general service manager, L. K. Marshall, and his staff have been developing this plan which they believe will fill the needs of both owners and dealers better than anything yet suggested.

Prescribed Service has been developed on the basis of three classes of service.

**Essential Services:** The number of jobs placed in the "Essential" class is small but of obvious importance in preserving the life of a car. Furthermore, they are the things that will keep owners coming in regularly. They include such items as chassis and body lubrication, tire inflation, adding water to battery, inspecting

carburetor, air cleaner and crankcase ventilator inlet, changing engine oil, minor tune-up, changing transmission and differential lubricants.

**As Needed Services:** This classification includes the work that is recommended purely on the basis of the individual requirements of the car. Driving habits and driving conditions determine when these services are necessary. An incomplete list gives a general idea of the type of work included in the "As Needed" classification. Replacing spark plugs and cables, overhauling distributor, replacing battery cables, starter and generator service, cleaning and overhauling carburetor, reconditioning valves, adjusting brakes, alining front wheels, replacing piston rings, etc.

**Insurance Services:** These are what might be called luxury services and are to be sold to the owner as such. They are not absolutely necessary but they will add security and pleasure to driving. Many owners are not able to afford "Insurance Services." Some of the services included in this list are—tire switching, washing and

polishing, general body and chassis tightening, complete reconditioning hydraulic brake system, replacing radiator and heater hose, oiling and checking car heater, etc.

As a result of Prescribed Service, Pontiac dealers' service departments no longer will recommend, for instance, that a carburetor be overhauled every 15,000 miles. Experimental engineering work and service records prove any such periodic overhaul based on mileage alone is entirely unnecessary.

The same thing is true of spark plug replacement. In the past, most service stations recommended that spark plugs should be replaced every 10,000 miles. Pontiac engineers and service men say that with proper cleaning today's spark plugs will run far beyond the 10,000 mile mark.

Service Manager Marshall realizes that such abrupt changes from the old rule-of-thumb or mileage basis to the new Prescribed Service plan are going to be more difficult for the service men to handle than to just keep on trying to sell the owner more and more service for his car. But he is equally sure that it will give greater satisfaction to the owner, provide a type of service that every owner can afford, and bring in more customers.

# Defense Savings Pay-Roll Allotment Plan

How company heads can help their country, their employees, and themselves

voluntary pay-roll allotment plan helps workers provide for the future helps build future buying power helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

**Many benefits . . . present and future.** It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

**Let's do it the American way!** America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

**In emergencies, America doesn't do things "hit-or-miss."** We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

**How big does a company have to be?** From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

**No chore at all.** The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

**Plenty of help available.** Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all you have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

**The first step is to take a closer look.** Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.

France left it to "hit-or-miss" . . . and *missed*. Now is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.



## FREE - NO OBLIGATION

Treasury Department, Section A,  
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name \_\_\_\_\_

Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

Here is a brief digest of important articles appearing in this issue of MOTOR AGE. Read the digest and discuss them with your customers.

### POINTERS ON WHEEL STRAIGHTENING

It has always been advisable in some cases to straighten bent wheels instead of replacing them, and some shops have found the business lucrative. Now more than ever a shop must



be prepared to do this type of work, since replacement parts will hardly be plentiful. This picture article gives all needed details on going the work rapidly, correctly, and profitably.

### CARBURETOR CLEANING

Doing good carburetor work is speeded up and made more dependable when the parts have been thoroughly cleaned. This is a simple job when the method described in this article is used. The secret is a good solvent.

### WOMEN WILL DO THE BUYING

With thousands of men going into the Army and Navy, and moving to distant points to enter war industries, the women they leave behind will assume the job of keeping the family car running. This piece points out how the serviceman can best appeal to this type of customer.

### TROUBLE SHOOTING WITH A PRESSURE GAGE

Second in the series of Pop O'Neill stories, in which the veteran serviceman continues his instruction of a youngster he is training to replace one of his older mechanics. Hundreds of servicemen face the same problem today and will therefore derive positive benefit from this series. This month's article takes up the correct use of the pressure gage.

### HOW TO REPAIR DAMAGED TIRES

Of all the services a shop can offer now to ease the problems of car owners, tire repairs are one of the most important. For worn treads, of course, the remedy in the absence of



# JOBBER'S OF THE JANUARY

**W**AR today is no longer a probability; it is a reality. No one as yet can foresee all that actual armed conflict will mean to the United States, to business as a whole, and to the individual serviceman. The most that can be said with certainty is that war will bring tremendous changes.

In its effect on the automotive business, war will bring much the same problems to both serviceman and jobber. Chief among them will be maintaining an adequate supply of replacements and skilled labor. Neither jobber nor serviceman can put his own interests before that of the government in prosecuting the war but they can do much simply by working together in tackling their problems.

As for some months past, MOTOR AGE has emphasized the changes due to defense, now intensified by war. This issue contains many articles dealing with the situation as it appears today.

As a jobber, you will find these articles "must" reading. They indicate the kind of cooperation your customers need.

new tires is retreading, but there are normally thousands of tires discarded or doomed to early destruction because damage to casings was not repaired properly and promptly. Here in a picture article are the helps you need to make dependable repairs.

### EASIER MAGNETO SERVICE

There are some surprising facts in this veteran serviceman's view of the ignition situation. Magneto's, he finds, are becoming increasingly popular for many types of gasoline engines, particularly in aircraft, outboard motors, a growing number of trucks, and on engines on such industrial equipment as air compressors and pumps. He foresees an increasing de-



mand for magneto service and offers some fundamental pointers on testing these units.

### HI-TORK BRAKE ADJUSTMENT

If a serviceman is interested in keeping up with every type of brake or has a shop that gets a share of truck repairs, this is an article to interest him. It gives all needed service data on this Wagner self-energizing brake, which is used on some models of International trucks.

# DIGEST MOTOR AGE

## HOW'S BUSINESS

A MONTHLY REPORT ON MAJOR ITEMS BY 500 JOBBERS

DECEMBER, 1941

NATIONAL TOTAL		Good	Fair	Poor	NATIONAL TOTAL		Good	Fair	Poor
ACCESSORIES		Fair		SHOP EQUIPMENT		Fair			
Abrasives	81	84	14	Battery Charging Equipment	79	84	22		
Anti-Freeze	119	39	25	Car Lifts	17	50	93		
Car Radio Sets	11	28	66	Car Washers	9	32	106		
Car Radio Accessories	12	26	62	Compressors	78	76	56		
Chains	38	73	63	Drills (Electric)	64	94	33		
Heaters	92	69	22	Electric Testing Equipment	38	69	68		
Horns	7	61	75	Jacks (Garage)	61	115	18		
Laquers	64	100	19	Lubricating Equipment	37	86	48		
Oil Filters	106	85	10	Paint Spray Equipment	26	82	68		
Oils and Greases	34	62	37	Tire Service Equipment	8	44	91		
Polish	18	103	65	Tool Kits and Sets	52	76	42		
Seat Covers	31	93	46	Valve Refacers	33	82	62		
Thermostats	120	64	8	Wheel Aligners	22	64	69		
	733	887	512	Wheel Balancers	26	64	72		
				Frame Straighteners	13	39	87		
				Headlight Testers	13	36	93		
				Welding Equipment	51	77	46		
					627	1170	1074		
REPLACEMENT PARTS		Good		TIRES		Fair			
Axle Shafts	46	108	55	Castings	19	26	13		
Ball and Roller Bearings	124	82	11	Tubes	24	28	13		
Brake Lining	134	75	12		43	54	26		
Bushings	58	110	37	ELECTRICAL UNITS		Good			
Chains (Timing)	39	106	63	Armatures	81	103	19		
Clutch Plates and Parts	117	80	11	Batteries	142	58	9		
Fan Belts	145	75	8	Cable (Battery)	134	83	9		
Gaskets	168	45	6	Coils	107	97	19		
Gears (Rear Axle)	40	108	55	Other Ignition Parts	125	90	8		
Gears (Transmission)	60	108	34	Fuses	86	116	17		
Mufflers	174	46	5	Ignition Wire and Cables	116	106	13		
Pistons	78	109	21	Lamps	114	97	10		
Pins	66	115	7		905	750	104		
Rings	137	71	3						
Radiators and Cores	31	60	65						
Spark Plugs	169	48	8						
Springs (Chassis)	39	79	45						
Valves	99	98	12						
Water Pump Parts	149	56	8						
Engine Bearings	158	46	6						
	2031	1625	472						

### MOST ACTIVE LINES

Positions of Leaders	Nov. 1941	Nov. 1940	Jan. 1941	Positions of Leaders	Nov. 1941	Nov. 1940	Jan. 1941
Mufflers	1	2	1	Other Ignition Parts	11	13	42
Spark Plugs	2	3	9	Ball & Roller Bearings	12	20	19
Gaskets	3	7	3	Thermostats	13	5	7
Engine Bearings	4	9	6	Anti-Freeze	14	1	4
Water Pump Parts	5	6	5	Clutch Plates & Parts	15	16	20
Fan Belts	6	10	17	Ignition Wire & Cable	16	14	13
Batteries	7	8	2	Lamps	17	11	8
Rings	8	15	11	Coils	18	19	18
Brake Lining	9	17	11	Oil Filters	19	18	15
Cable (Battery)	10	12	10	Valves	20	...	...

#### HOW ITEMS ARE RATED

"Most Active Lines" are chosen on the basis of the highest number of jobber reports indicating "Good" for the items selected among the twenty most active lines. "Activity" as used here has no bearing on volume, so the lists should not be interpreted as meaning the lines on which jobbers are enjoying the greatest volume. Most active lines are those which the greatest number of reporting wholesalers indicate are selling "considerably above normal" in their particular markets.

#### HOW TO READ THIS CHART

Information from which this chart is compiled is obtained monthly from a selected list of 500 wholesalers. Figures show the number of wholesalers reporting. Normal is taken as average sales for this month during the past few years.

Good—Sales considerably above normal.  
Fair—Sales slightly above or below normal.  
Poor—Sales noticeably below normal.

### DIFFERENTIAL SERVICE

Another of those timely and helpful picture articles that keep the alert serviceman up to the minute on



the latest developments. This one deals with the rear-end unit of the 1942 Pontiac, detailing in text and photographs each successive step in disassembling the unit.

### BATTERIES BOOST REPAIR BUSINESS

This is a piece to interest both the shop that is doing a good volume of battery business and the one that would like to do more. The shop discussed is one that got into battery selling and service years ago and has built its repair business largely on the quality of its battery service. Further, it does not have to give away any battery service. It has educated customers to pay for it.

### REMOVING FRONT DOOR LOCK

To save the serviceman's time in removing the front door lock and the remote-control assembly, this piece details in photographs and brief text the simplest method of doing the work. This class of work is bound to be in greater demand in the future, since it is needed most often by older cars. With new-car production virtually at a standstill, we're going to have older cars to service.

### SERVICE IN A MODEL ARMY SHOP

Proceeding on the theory that the best is none too good when it comes to keeping the Army's automotive equipment on the move, the new shop of the Philadelphia Quartermaster Depot has given its mechanics every machine and every tool they could possibly need, and has housed it all in a roomy, well-lighted, modern building. Every serviceman will want to read the yarn, if only to envy the Army's superb shop equipment.

### AIM THE HEADLIGHTS

Here is a simple job that can be made troublesome when it is approached in the wrong way. This article explains the proper, and therefore the easy way, to aim the headlights.





## .... the Story of a Manufacturer who *got lost in World War I*

This company, Company A, a regular advertiser before the first World War—was a real factor in the — — business—holding a high ranking place in the industry. Another company at that time was not well known as a manufacturer of this same product.

War orders took much of Company A's time. They stopped their advertising on — —.

The other company, Company B, during the war period, decided to get recognition for their — —. In 1918 they started a

dominant advertising program in the leading automotive business papers. This advertising soon brought them into a leading position in the industry—a position they have never relinquished.

Company A were never able to recover their lost position.

You won't get lost in World War II if you keep on advertising in **MOTOR AGE**, *A CHILTON Publication*, Chestnut & 56th Streets, Philadelphia, Pa.

## R. W. Terry Elected New President of NSPA

R. W. Terry, of United Wholesalers, Sioux City, Ia., was elected president of the National Standard Parts Association at the 18th annual convention of that body, held Dec. 15 to 18 at Chicago. W. C. Dodge, Jr., of Ferodo & Asbestos, Inc., New Brunswick, N. J., was chosen senior vice president, and William J. Menghini, of the Springfield Auto Supply Co., Springfield, Ill., was elected junior vice president.

New directors elected at the convention were D. L. Naylor, Auto Spring and Supply Co., Wichita Falls, Tex.; A. Dean Lacey, Lacey Auto Parts Co., Salinas, Cal.; H. W. Knapp, McQuay-Norris Mfg. Co., St. Louis, Mo.; W. R. Waddell, Federal-Mogul Corp., Detroit, Mich.; and C. S. Rogers, P & D Mfg. Co., Long Island City, N. Y.

The convention, due to the emergency, was held without an exhibit, since the annual A. S. I. show was canceled. Despite wartime conditions, however, the gathering was marked by optimism and was attended by representatives of 293 member firms and 82 non-members. Individual registration was 823 and attendance at the several sessions set a new high.

Convention sessions were addressed by Arch T. Colwell, president of the S.A.E., Lieut. Col. Edwin S. Van Deusen, chief, Procurement Branches, Motor Transport Division of the War Department, Alex Taub, chief, Conversion Section of the OPM Contract Distribution Division, and T. J. McCormick, special representative of the Acting Administrator, Wage and Hour Division of the Department of Labor.

## Knudsen Among Speakers for NADA Annual Meeting

William S. Knudsen, director general of the Office of Production Management, will be among the noted speakers to address the annual convention of the National Automobile Dealers Association at the Palmer House, Chicago, Jan. 18 to 21.

The convention also will be addressed by Leon Henderson, director of both the Office of Price Administration and the Office of Civilian Supply. Senator Clyde L. Herring, of Iowa, member of both the Finance and Banking Committee and the Currency Committee in the Senate, also will speak. L. Clare Cargile, president of the NADA, is the fourth noted speaker of the program.

Detailed reports and resolutions will not be handled in the main convention sessions this year, it is announced.

Lynn S. Snow, of Oak Park, Ill., has been named chairman of the convention.



## The "PEAK OF QUALITY"

that Time will never change

WHEN we started to manufacture brake parts and brake fluid we established a definite, clean-cut policy—to place Quality at the highest peak and keep it there.

The brake stations we serve through our jobbers know how rigidly we have adhered to that early rule through the years.

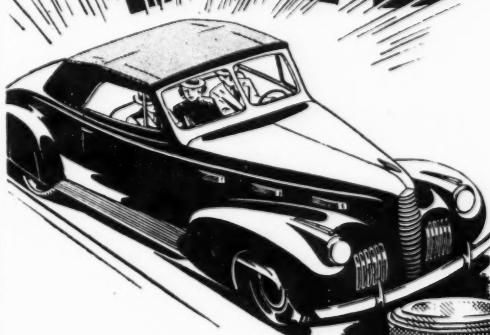
Today, with sources of supply uncertain and the lure of inferior substitutes ever present, we refuse to be swerved from the high standards that have won us the confidence and good will of a host of friends.

When you supply Eis Brake Parts and Brake Fluid to your trade you know that you are giving them "peak" Quality merchandise.

Send us your jobber's name if he can't supply Eis Products

EIS MANUFACTURING CO., INC., MIDDLETOWN, CONN.

## It's TOPS for Renewing Faded Convertible Tops!



### Truck Tarpaulins

and similar fabrics, also are made like new with CONVERTO DYE. This remarkable solution, developed on a unique, scientific basis, by one of the world's largest chemical manufacturers, WORKS WONDER!

It goes IN not only ON—and WEARS practically as long as the fabric itself.

To speed sales of used convertibles with bright tops—or to make a big hit in service—get this new product NOW and count NEW Profits.



Get EXTRA, quick profit, making worn, faded tops like new, simply, economically. New pigmented solution, easily applied with brush or spray, dries quickly, becomes part of fabric. Not a paint nor dressing. Does not crack.

## CONVERTO DYE

is sun - water - weatherproof. Jet black or rich olive-tan. A "hot" money maker! If your jobber cannot supply you, mail coupon. We will arrange shipment from your nearest jobber. Send TODAY!

The MERCURY Corporation  
Kansas City, Missouri

The MERCURY Corp. Kansas City, Mo.

Send me details about CONVERTO DYE free.

Send me

CONVERTO DYE  Quarts BLACK  Quarts OLIVE-TAN

Check enclosed  C.O.D.  
Dealer Price \$1.65 per quart (1 qt. sufficient for average size convertible)

NAME.....

ADDRESS.....

## VITAL TO -

- Low Mileage Costs
- Easy Operation
- Maintained Schedules



Clean as a Rifle Barrel!

### RIMAC VALVE GUIDE BRUSHES

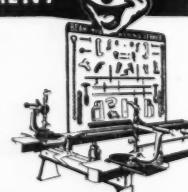
A few up and down strokes  
—and every trace of carbon  
is removed with Rimac  
Valve Guide Brushes. No  
scratching. One handle with  
solid steel shank takes all  
sizes. Only 5 sizes fit 90%  
of all cars and trucks. SET  
No. HB-5, net \$2.25.

RINCK-MCILWAINE, INC.  
16 HUDSON ST., NEW YORK, N. Y.



Help Conserve Rubber  
... Equip for BEAR  
WHEEL ALIGNMENT

Get started RIGHT in big-  
paying wheel-alignment  
work, with complete Bear  
No. 196-821 Steering Service  
Unit. Includes all es-  
sential tools and gauges  
you need to do the job right  
from start to finish. Frame-  
straightening tools can be  
added later. Write for  
FREE Manual. Bear Mfg.  
Co., Rock Island, Ill.



# BEAR

## Perfect Circle Starts New \$100,000 Laboratory

Final plans and specifications have been approved for the first unit of a new Perfect Circle Co. laboratory building, which was started at the Hagerstown, Ind., plant Dec. 8.

The first unit will contain offices, garages, machine shop and drafting room, and will be located directly north of the present plant.

The new addition has been contemplated for some time because of inadequate space in the present laboratory, which was outgrown several years ago. The additional facilities are in a measure needed to provide more adequate engineering facilities for the research work on piston rings for defense. The one-story building will be constructed of concrete and brick, to conform to the general design of other buildings and will cost approximately \$100,000.

## MEMA and MEWA Plan Joint Conference in Feb.

With the cancellation of the Annual Automotive Service Industries Show, the MEWA and MEMA plan a Conference Convention to be held in Chicago on Feb. 16 to 18. Already an exceptionally interesting program is taking shape.

The MEWA program will include a series of discussion clinics covering timely subjects. Also several top ranking men from the OPM, who direct the different sections effecting the business of the automotive wholesaler and manufacturer, will be present to give a complete, yet compact and understandable picture of what the present and future trends will be.

The discussion clinics will follow the lines of the ones held at last year's MEWA convention.

### Brake Lining Catalog

A revised edition of its Simplified Brake Lining Catalog has been announced by the Gatke Corp., 228 W. LaSalle St., Chicago, Ill. Compiled so as to provide quick reference, the catalog lists boxed lining sets for all popular cars and trucks, with alphabetical listings by make, year and model to make it easy to find part number and list price of any set.

### Joins Buda

A. A. Gustafson has recently been appointed director of personnel and safety of The Buda Co. in Harvey, Ill. He is a graduate mechanical engineer from Purdue University. He has had 15 years practical experience with manufacturing concerns in the Chicago area, namely, with the Anderson Co. of Gary, Ind., Hubbard Steel Foundry Co. of East Chicago, Ind., B. F. Gump Co. of Chicago, Schweizer-Conrad Co. of Chicago.



Taylorized Steel gives best grip, longest wear — four-fold profits for dealers. Write for selling plan.

**S. G. TAYLOR CHAIN CO.**  
HAMMOND Established 1873 INDIANA

HERE'S A HORSE OF A DIFFERENT COLOR



STOP TROUBLE BEFORE IT STARTS

**Handy**

## RECT-O-LYZR

**FAST CHARGER**  
Accurately tests each cell  
SEPARATELY and charges  
fast and SAFELY at auto-  
matically tapered rates  
—without removing bat-  
tery from car. \$210.00  
Price complete.

Ask for Bulletin 308  
BALDOR ELECTRIC CO.  
4375 Duncan Ave.,  
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## YOU'LL NEVER KNOW

● THE PROFIT OPPORTU-  
NITY in Fitzgerald Gaskets until  
you handle them.

THE FITZGERALD MFG. CO., TORRINGTON, CONN.

## FITZGERALD GASKETS

**THERE'S ONLY**

**1**



**BURN-OUT PROOF  
DIRECTIONAL SIGNAL SWITCH**

In complete sets of Signal-Stats or as a  
replacement switch—ASK YOUR JOBBER

**SIGNAL-STAT CORPORATION**  
68 JAY STREET BROOKLYN, N. Y.

## PROFITS BY CONSERVING!



**Profit Opportunities!** This winter and spring millions of cooling systems will need cleaning and protection against leaks, rust, and corrosion. Be prepared to get all the jobs that come your way. Make better than 40% profit.

**Conserve Materials!** The Nor'way Cooling-System Service helps preserve the vital materials in the cooling system . . . saves replacement-use of war essentials . . . helps keep motors efficient, conserving anti-freeze, gasoline, and oil.

### NOR'WAY COOLING-SYSTEM SERVICE

consists of

**NOR'WAY CLEANER:** Loosens rust, grease, and scale without reverse flushing.

**NOR'WAY QUICK FLUSH:** May be used while car is in service.

**NOR'WAY STOP LEAK:** Flows freely in system, works with all standard anti-freezes.

**NOR'WAY ANTI-RUST:** Protects against corrosion of all six metals.

### SELF-SELLER DISPLAY RACK **FREE**

with Split-Case  
Assortment at  
Full-Case Price

SPRING  
DATING

ORDER  
FROM YOUR  
JOBBER TODAY!

### COMMERCIAL SOLVENTS Corporation

17 EAST 42ND STREET, NEW YORK, N. Y.



### Ray Chamberlain Joins NADA as Vice-President

Ray Chamberlain, seasoned veteran of the automotive industry and a 25-year employee and executive of the Packard Motor Car Co., resigned early in December to take over his new post as executive vice-president of the National Automotive Dealers Association.

One of the best-known and most highly respected executives of the motor industry, Chamberlain was drafted to head up the NADA at a time when the association membership faces many new problems growing out of defense production. Chamberlain will take up active negotiations in an effort to find a solution to current obstacles faced by some 44,000 automobile dealers throughout the nation.

Chamberlain was born in Topeka, Kan., and entered the motor industry in 1906 as an apprentice machinist for the H. E. Wilcox Motor Car Co. of Minneapolis.

In 1921, Chamberlain was made general sales manager of the Packard Motor Car Co., and since that time has served in almost every executive post. In 1937, he was appointed to the position of manager of merchandising for Packard. He held this position at the time of his new appointment.

### Tire Company Offers New Line of Batteries

The Pennsylvania Rubber Co., originators of Pennsylvania Vacuum Cup tires, will introduce a complete new line of quality batteries for automobiles, trucks, and buses early in January.

In making the announcement of the new battery line, Howard W. Jordan, president, stated that it will be sold under the brand name "Pennsylvania" and distributed throughout the United States by the independent tire dealers who are now selling Pennsylvania tires and tubes.

The company will merchandise an efficient, modern, fast-charging unit and a complete line of other up-to-date tools for checking and installing all size batteries.

### Radio Service Manual

The Radio & Technical Publishing Co., 45 Astor Place, New York City, has announced the second edition of "Radio Troubleshooter's Handbook," by Alfred A. Ghirardi. It is priced at \$3.50.

The new edition is larger than the first, and contains 710 pages of information on the design, construction and repair of all makes of radios. Listed are the symptoms of trouble, the cause and the correction method. Covers household sets and automobile radios.

**you  
can  
do** **MORE work  
BETTER  
with "a KING"  
TESTER**



**The  
"KING"  
MT-625**

**SOLD ON  
DEFERRED  
PAYMENTS**

"KING" Testing Units are used in repair shops in every state in the Union and many foreign countries. They are especially designed for efficient operation and are carefully built to give years of service. A "KING" Tester will enable you to do MORE and BETTER work. The "KING" MT-625 Tester has a Cam Angle Meter (patent applied for) to test and adjust distributors. An Electro-Tach (or R.P.M. Indicator) is used to make engine adjustments to specified factory speed. It has a Coil and Ignition Tester, an All-Electric Spark Plug Tester (patented), an oscillator type Condenser Tester, and an Exhaust Gas Analyzer. The "KING" MT-625 is a beautiful, streamlined unit that will make every conceivable Motor and Ignition test.

### use "KING" FAST BATTERY CHARGER

The "KING" Type FC-3 FAST Charger is a quality unit to which we have added the following features: (1) A quick acting circuit breaker is incorporated to instantly open the charging circuit

in case of a short circuit. (2) A "hold" position is built in the time switch to simplify charging batteries in parallel. (3) We have added an efficient Battery Tester. The discharge unit is connected by means of a push button magnetic switch. It applies a 250-ampere load which is necessary for making an accurate test. (4) We provide TWO accurate moving coil type Meters that give all readings at a glance. (5) Large pneumatic tires are optional. They make it possible to easily move Charger over rough surfaces.



The "King" FC-3  
Fast Battery Charger

Ask Your Jobber or Write us Jobber's Name

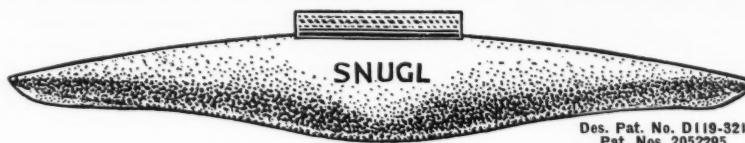
CYCLE ELECTRIC HEAT CONTROL CO.  
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## Easier Steering Safer Driving

Your customers will appreciate the safety and longer tire wear Snugl Fade-Away gives them.

And you will appreciate the ease with which you can install and adjust



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these wheel balancing weights that can't rattle or work loose at high speeds. Snugl made also for Heavy Duty Trucks.

Write TODAY for details.

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Western Distributor: Kenneth V. Mills, 910 W. Pico Blvd., Los Angeles, Cal.

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It has  
ZIP-ACTION

removes or tightens nuts in a jiffy.

BEALL SPEED-RATCH is the new, improved Ratchet Wrench with patented pull-chain in handle. Quickly and easily tightens or loosens nuts at the hard-to-get-at spots—without finger manipulation. Saves valuable time in Auto Repair work. Satisfaction guaranteed. ASK YOUR JOBBER or write us. List Price . . . . .

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Take a Tip  
on SETTING  
AUTO GLASS!

## No Glass Breakage!

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### EVERSEAL Channel Stripping

This is because, with Everseal, you don't have to pound the glass into place. A light hand pressure does the trick. It's quicker too—and you're always sure of a watertight fit because Everseal swells after it is set. Write today for a Free Sample.

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## Wilkening Gives Plaque to Veteran Jobbers

A beautiful plaque, framed in natural wood and especially prepared for each concern, has been presented by Wilkening Manufacturing Co., Philadelphia and Toronto, to all jobbers who have had a long, unbroken record in the distribution of Pedrick piston rings.

The first presentation was made to Mr. E. P. Rotzell, president of E. P. Rotzell Co., Philadelphia. The Rotzell organization has been distributing Pedrick piston rings continuously for over 11 years.

Other notable awards include Van Horn & Son of New Orleans, 19

years; Balco-Pedrick Parts Corp. of Buffalo, N. Y., 19 years; Hill Piston Service Co., of Battle Creek, Mich., 19 years; Jenkins Automotive Parts Service of Columbia, S. C., 19 years;

## Garagemen in Akron Reorganize Association

Akron Associated Garages has just recently been reorganized and has appointed an entirely new group of directors. The new President is Jack Kelly; the new vice president is Robert Canter, and the duties of secretary-treasurer are being temporarily held by C. E. Coltrin, secretary-manager of the Akron District Automobile Dealers Association.

The garage members asked Coltrin to help organize the new association, which at the present time has a membership of 85 with hopes of increasing it to 150.

The association has three purposes:

- 1—The sponsorship of good service work by reliable dealers and merchants.
- 2—The protection of the garagemen's present business from all other outside interests which may detract or adversely effect their operations.

Make Big Profits on Small Investment in  
**SHURHIT IGNITION PARTS**

Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts . . . Contact Points . . . Condensers . . . Rotors . . . Caps . . . Colls . . . Switches, etc.

**SHURHIT PRODUCTS, INC.**  
Waukegan, Ill.

3—The establishing of policies and rulings which, as a group, will benefit the garagemen.

## NAPA Annual Meeting Called for Next Month

The annual meeting of the National Automotive Parts Association and associated manufacturers will be held at the Biltmore Hotel, Atlanta, Ga., Feb. 3 and 4, 1942, according to announcement by Henry Lansdale, vice-president and general manager of the organization.

The NAPA Council will meet at the Biltmore on Feb. 2, preceding the general meeting.

**TAPERED ROLLER BEARINGS**

**Tyson**

**ROLLER BEARING CORP.**  
MASSILLON, OHIO

**LION**  
is still able to  
deliver the **GOODS!**

**Now, in these  
stirring times,  
it is paying  
you DIVI-  
DENDS for  
Lining Up  
With LION.**

**Dependable  
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PLYMOUTH

**We are still  
supplying our  
old customers  
the bulk of  
their require-  
ments!**

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CHICAGO DALLAS MONTREAL

## JIM ASBESTOS says

Plenty of crashes can be avoided this winter with brake lining that's built to stop cars quickly and smoothly . . . and that *keeps on* stopping them! To smart motorists and servicemen everywhere, that means

**The Lifesaver of the Nation's Highways**  
**JOHNS-MANVILLE BRAKE LINING**

## THE DE LUXE HORN



These graceful, yet sturdy constructed deep-toned air horns are specially designed for moisture-proof, trouble-free service. Their vibrant, penetrating, yet melodious signal increases driving security through certainty of being heard. Sound range from 1 to 10 miles. Write for literature.

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**FOREMAN**  
BATTERY  
BOOSTERS

*for Faster Battery Charging*

W. D. FOREMAN  
★ 5350 S. STATE ST., CHICAGO, ILL. ★

## Indianapolis Race Classic Is Washed Out by War

War has made it advisable to suspend the Indianapolis 500-mile race for the duration, it has been announced by Capt. Eddie Rickenbacker, president of the Indianapolis Speedway.

"Tradition and priorities demand that we again voluntarily abandon the race in the interest of a full-out victory effort," said Capt. Rickenbacker.

Only twice before since the race was founded in 1911 has it been suspended. That was in 1917 and 1918 when the United States was engaged in World War I.

Fate of the other big-car races and of midget racing is still in doubt. Ted Allen, secretary of the AAA Contest Board, has announced that a meeting of track owners would be held soon to decide whether the races can be held in the face of existing difficulties.

## Rural Wage Earners Dependent on Cars

To millions of Americans, the grass looks greener on the other side of the city limits. Not all such persons are farmers, even though they live in the country. Many of them drive to town daily to work in an office or factory, then make a bee-line for their rural homes right after the 5 o'clock whistle blows.

For the first time, the transportation needs of the 18 million Americans who live in unincorporated suburbs, villages and in open areas—but not on farms—are becoming known. No other group in the country, except farmers, has less access to mass transportation facilities than these non-farm rural dwellers. Analysis of thousands of driving records indicates that this group, which owns 13 per cent of all passenger cars, has a pattern of car usage all its own.

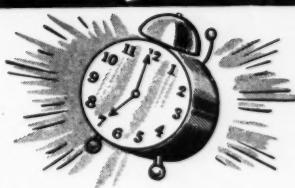
Annual mileage per car of 8120 as shown by the sample, contrasts with the 5728 miles per year traveled by the farm car. It is more similar to urban driving, where total mileage per year averages up to 8994 miles.

But the percentage of necessity driving, predominantly trips to work and on business, was found to be 62.6, which is comparable with the 66.8 per cent among farm cars.—*Automobile Facts*.

## Tire Chain Booklet

American Chain & Cable Co., Bridgeport, Conn., has an interesting brochure on the subject of merchandising and selling tire chains. An explanation of the service features of Weed chain, together with selling points, list of prospects and other valuable information is included in "Weed Chain Sales Meeting in Print."

## WAKE UP!



The biggest dollar's worth of performance you ever saw in bearings is yours when you ask for—



Exclusive roller and race-way design assures longer wear — smoother action. Perfect for Front Wheels, Differentials and Rear Axles—Ask your Jobber!



8732A

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Warehouses in all principal trading centers

## VALLEY Super Duty Chargers Meet 1942 Conditions

• Fully Guaranteed for Two Years — Valley modernized super-duty chargers will give you the utmost in value . . . enable you to cash in on the big profits in battery charging. Valley chargers are easy to operate . . . no moving parts . . . connecting to the lighting circuit. Low in operating cost. Order yours today. Model SG-12 charges 1 to 12 6 volt batteries—\$28.00.



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## —it's a job for— KESTER SOLDER

- DOZENS OF THINGS can go wrong with a car—especially if it has seen better days—that Kester Cored Solders can fix, neatly, permanently, in quick time.
- Kester Acid-Core Solder is the general-purpose material for all-around auto repairs. It's first aid to shop profits everywhere.
- Kester Rosin-Core Solder, specially compounded for all electrical work, makes circuits permanent and trouble-free because it is corrosion-proof and will not injure insulating material.
- The special, more-active flux and free flowing alloy in Kester Radiator Solder get at hard-to-reach places and close leaks permanently.
- Kester Body Solder are so easy to handle and do such beautiful work that they will build a reputation for any shop in the profitable field of body repairs.
- Order Kester Cored Solders from your jobber!

KESTER SOLDER COMPANY

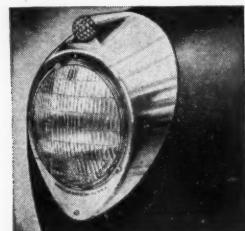
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CORED SOLDERS**  
STANDARD FOR INDUSTRY

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sealed beams keep 'em  
rolling safer and longer



ARROW Sealed Beam Headlight Conversion Kits make sealed beam lighting available for practically every model truck and passenger car. They are contributing to defense by helping to keep the motor transports rolling . . . and they are giving old car owners the extra safety and comfort of the new sealed beams. These ARROW kits are easy to sell, easy to install, and you make a profit on both the sale and the installation. See your jobber or write direct to P. O. Box 112.

Advertised Nationally in  
the Saturday Evening Post.

**ARROW SAFETY DEVICE CO.**  
MEDFORD, N. J.



FOR EXAMPLE:

cleaning greasy garage and  
service station floors safely

Don't take chances in cleaning floors, grease and "lube" pits in your shop with highly volatile "cleaning" fluids. For if you do, you are inviting a hazard that may endanger both life and property. Instead . . . PLAY SAFE . . . by using that modern, safe, fast-working material . . .

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Water-soluble, it can not burn or explode. Its vigorous penetrating action thoroughly, quickly softens and loosens grease, oil and muck, so that a light brushing and a rinse remove tough deposits easily. NEW, FREE, 36-page booklet gives complete story on this many-purpose, money-saving material. Write today!

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Representatives in All Principal Cities of the United States and Canada

**OAKITE**  **CLEANING**  
MATERIALS...METHODS...SERVICE FOR EVERY CLEANING REQUIREMENT



**SOUTHERN**  
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**Can't Come Loose!**



Wheel  
Balancing Weights



They  
Hold  
Securely

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Cleaning Compounds

for concrete floors, pits, motors, parts, trucks, radiators.  
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OF CUSTOMER  
SATISFACTION**  
Be Sure You  
Get It . . .  
THE TIMKEN ROLLER BEARING  
COMPANY, CANTON, OHIO

**Dodge Dealers Offering  
Pay-As-You-Drive Service**

Conceived as an aid to the many thousands of car and truck owners in this country who intend to keep their present vehicles in operation indefinitely, a Pay-As-You-Drive Modernization and Service Plan being featured by leading Dodge-Plymouth dealers as a new public service is gaining steadily in popularity.

As the name of the plan indicates, the car or truck owner who may prefer to have his present vehicle modernized from a nominal expenditure rather than assume the greater expense of purchasing a new vehicle, can have whatever service work may be required as well as accessories, battery, heater, radio or complete refinishing done at one place, at one time, and the entire transaction handled as a single purchase.

Surveys conducted among motor vehicle owners in all parts of the country, it is said, indicate that during the period of defense activity, the demand for modernization and service on a pay-as-you-drive basis will steadily become more widespread.

**Retail Buyers Need No  
Priority Certificates**

In the confusion incident to attacks upon the United States by the Axis powers, many distributors of consumers' goods have told their customers that they cannot sell to them unless their orders are accompanied by preference rating certificates. This seems to have been most prevalent among dealers who handle metal products, particularly in the farm machinery and hand-tools fields.

The Priorities Division points out that retail consumers cannot and must not be expected to produce preference rating certificates, when placing normal orders for finished goods.

In the case of important civilian items, as for example, farm machinery and spare parts for privately owned automobiles and trucks, the Priorities Division has given assistance to manufacturers so that they may continue their production. The goods manufactured as a result of this assistance are then made available through the normal trade channels, and retail buyers in general do not need, and have not been issued, preference rating certificates.

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**MENDALL METAL**

Cracked Blocks, heads, water jackets, scored cylinder walls, porous welds, inside leaks, permanently repaired with Mendall Metal and low torch heat. Positive Guarantee. Send \$3.75 now for regular six bar Five Dollar package, or One Dollar for one bar, prepaid.

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HOSE CLAMPS**



Standard throughout the industry for original equipment and replacement. For Radiator, Heater, Booster Brakes and High Pressure hose connections. Sold by dealers and jobbers everywhere.



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LUBRICATING  
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plays an important part in  
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by providing fast, thorough, and economical lubrication of cars, trucks, buses and other motor vehicles so important in the transportation of defense materials and men engaged in defense production.

Ask your nearest jobber, or write us for details on this equipment.

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MAKES MONEY  
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Make positive tests on  
Condensers, Coils, Lights,  
Continuous Generators,  
Shorts, Grounds, Leaks,  
etc. With this simple  
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Used by Army, Navy—  
approved by 50,000 users.  
as the fastest, most eco-  
nomical trouble shooter made—saves  
enough time and  
money in 30 days to  
pay for itself.  
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or write for FREE  
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Sold on 30 Day Guarantee  
T. & H. MFG. CO., 811 E. 31, K. C., Mo.

**"KEEP CARS  
RUNNING"**



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DIRECTOR OPM

SUPPLY and SERVICE

**WEED  
TIRE CHAINS**

AMERICAN CHAIN & CABLE COMPANY, INC.  
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